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Page 107, third line from bottom, for Hereford read Hertford

- „ 151, August. Sedgbrooke Maximum, for 86 on the 11th read 88 on the 9th
- „ 209, November. Sedgbrooke Minimum, for 26 on the 25th read 24 on the 30th
- „ 239, January. Sedgbrooke Maximum, for 51 on the 29th read 51 on the 28th and 29th
- „ 239, March. Sedgbrooke Maximum, for 55 on the 20th read 55 on the 20th and 31st
- „ 311, April. Sedgbrooke Minimum, for 29 on the 5th read 21 on the 5th
- „ 329, July. Sedgbrooke, for 81 on the 25th read 81 on the 25th and 27th

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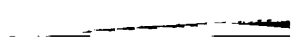
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THE NATIONAL ANTHROPOLOGICAL ARCHIVES, established in 1895, have the honor to announce that they have received from the National Museum, Washington, D. C., a copy of the report of the National Anthropological Archives for the year 1907. The report is a valuable contribution to the knowledge of the National Anthropological Archives, and is a most interesting and instructive work. It contains a full and complete account of the work of the National Anthropological Archives during the year 1907, and is a most valuable and interesting work. It contains a full and complete account of the work of the National Anthropological Archives during the year 1907, and is a most valuable and interesting work. It contains a full and complete account of the work of the National Anthropological Archives during the year 1907, and is a most valuable and interesting work.

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No 17. February, 1884.

THE UPPER LIAS OF NORTHAMPTONSHIRE.

BY B. THOMPSON, F.C.S., F.G.S.

Part I.

MANY papers and works have appeared at various times on the Lias formation, nevertheless, the Upper Lias of Northamptonshire seems to have been rather neglected by geologists. Prof. Judd has given a concise account of the Upper Lias as it is developed on the outskirts of the county north and north-east of Northampton⁽¹⁾; also Mr. T. Beesley, F.G.S.,⁽²⁾ and Mr. E. A. Walford, F.G.S.,⁽³⁾ have each written pamphlets giving an account of some of the lower beds of the Upper Lias exposed in the neighbourhood of Banbury, that is in the south-west of the county, and this appears about all that has been done. The late Mr. Saml. Sharp, F.G.S., F.S.A., who did such good work in the formations immediately above, seems to have quite neglected the Lias, so far as writing about it is concerned, though he collected a few good fossils from it, some of which I shall have to refer to in a future part.

I hope I shall be able, in these papers, to add a little useful matter to the literature of the subject, and to show that the Upper Lias of Northamptonshire is deserving of a share of the attention that is being bestowed on the formation generally.

I intend in these papers to speak particularly of the Upper Lias as it occurs say within a radius of sixteen miles of the town of Northampton, but I shall not hesitate to go outside this boundary, or indeed outside the county or district, where I think by so doing I can the more clearly explain the various phases of its development within the particular area mentioned.

(1). "The Geology of Rutland, and parts of Lincoln, Leicester, Northampton, Huntingdon, and Cambridge," by Jno. W. Judd, F.G.S.

(2). "A Sketch of the Geology of the Neighbourhood of Banbury," by Mr. T. Beesley, F.G.S.

(3). "On some Middle and Upper Lias Beds in the Neighbourhood of Banbury," by E. A. Walford.

ZONES AND BEDS OF THE UPPER LIAS.

A complete typical section of the Upper Lias for the whole of England would embrace the following well recognized divisions :—

Zone of <i>Ammonites</i> <i>Jurensis.</i>	{	1. Upper Lias Sands	{	"Midford Sands" (Prof. Phillips.)
				"Cynocephala Stage" (Dr. Lycett.)
Zone of <i>Ammonites</i> <i>Communis.</i>	{	2. Leda ovum Beds	{	
		3. Communis Beds		
		4. Serpentinus Beds		
		5. Paper Shales, with Fish and Insect limestones		"Dumbleton Series" (Prof. Judd).

The Upper Lias Sands of Dr. Wright were, and are still I think by some geologists, regarded as belonging to the Inferior Oolite. It is very doubtful at present whether they are represented in Northamptonshire, but the evidence for and against I shall consider later on. With regard to the other four beds or zones there is no doubt, they are all developed, and some of them exceedingly well.

EXTENT.

The Upper Lias is met with chiefly in the counties of Dorset, Somerset, Gloucester, Oxford, Northampton, Rutland, Leicester, Lincoln, and York; beginning as it were on the coast of Dorsetshire and ending on the coast of Yorkshire.

As a superficial formation the Upper Lias is not so well developed in Northamptonshire as in some of the counties mentioned above, though to the north and north-west of Northampton, that is chiefly along and to the west of the Market Harborough railway line, it occupies a considerable area around the villages of *Great Brington*, *East Haddon*, *Ravensthorpe*, *Cottesbrook*, *Kelmarsh*, *Arthingworth*, *Braybrook*, etc., forming some stiff clay lands. In this area, however, a good portion is covered with drift clay or gravel, and sections are not as common as they are further east and south.

For a considerable distance around Northampton both the larger and smaller streams run almost exclusively over Upper Lias clays; and on all sides, except the area included between north and north-west, the streams have reached the clay by cutting through the originally overlying strata, forming wide, and, in some cases, deep valleys. In the area included between north and north-west the streams run the whole of their course on the Upper Lias, without anywhere cutting through it: the *Callender Brook* and *Stowe Brook* are instances of this.

The river *Nen* runs over Lower Lias clay from its source near Staverton to near Kislingbury, and on Upper Lias clay from near Kislingbury to a little beyond Thrapstone, and all the feeders of this stream within the last-named limits have cut down to, and run over the Upper Lias clay nearly from their sources. The *Tove* too—a tributary of the Ouse—together with

all its feeders run over these clays, and the same might be said of the *Ise*, which, rising near to Naseby, flows by Arthingworth, Rushton, and Kettering, and joins the Nen at Wellingboro'.

The Upper Lias seems to be quite continuous as an underground formation over the whole of the district just described, and is apparently little faulted. The various watercourses form as it were an intricate system of *inliers*.

To the west and south-west of the county *outliers* of Upper Lias are common, though in almost every case they are capped by the Northampton sand. Instance may be found at or near *Daventry, Newnham, Everdon, Badby, Hellidon, Byfield, Aston-le-Wall*, etc.

THICKNESS.

I think the greatest recorded thickness of the Upper Lias is 380 feet, and this it attains to at Bredon, in Gloucestershire. On the Coast of Dorsetshire it is about 210 feet in thickness, according to Mr. Day, but as it passes into Somersetshire it thins out considerably, and in that county is seldom more than 8 to 10 feet in thickness; it again attains a very considerable vertical development in Gloucestershire, indeed its greatest, as mentioned above, though at Wotton Underedge it is only about 10 feet. Oxfordshire has a small development, about 40 feet as a maximum, and at Fawler only 5 feet. It again thickens in *Northamptonshire*, and in places reaches upwards of 200 feet, and according to Prof. Judd it is 200 feet thick in Rutland; it increases to 300 feet in Leicestershire, and then declines as it goes northwards, being 200 feet in South Lincolnshire (Judd), 60 feet further north (Woodward), and disappears entirely in South Yorkshire (Judd), to reappear further north, in the same county, with a thickness of 200 feet (Phillips).

There are no sections in Northamptonshire where the Upper Lias can be measured as it can be in the cliffs of Dorsetshire and Yorkshire, but it has been frequently cut through in the neighbourhood of towns for the purpose of reaching the water supply of the Middle Lias, and in a few instances a record has been kept of the strata passed through. I cannot make all these sections that have come into my hands agree with one another, or with my own observations in one or two cases, but they will give a fairly satisfactory idea of the total thickness of the Upper Lias beds.

The following is the account left of the strata passed through in making the water-works well, on the Billing Road, Northampton, some 38 years ago.

SECTION OF WATER-WORKS WELL, BILLING ROAD.

				Ft.	In.
	1.	Made ground	...	14	0
	2.	Soil	...	2	0
<i>Inferior Oolite</i>	...	3.	Brown stone—rubble	4	0
<i>Northampton Sand</i>	4.	Brown rock, with water in lowest portions		2	0

		5.	Hard blue clay clunch which required blasting with powder. Many small shells in it	...	...	Ft.	In.
						135	0
<i>Upper Lias</i>	...	6.	Dark sand and water	...	...	0	9
		7.	Hard grey blue stone	...	...	1	0
		8.	Blue clay	...	...	1	0
		9.	Blue stone and clay	...	...	0	9
<i>Marlstone</i>	...	10.	Very hard green grey rock...	...	...	7	6
						168	0

The italics are my own.

From the above section the Upper Lias appears to have a thickness of nearly 139 feet.

During the sinking for water on the Kettering road some four years ago, at a point a trifle over a mile from the last section, nearly, if not quite all the Upper Lias was passed through, and the account given by the sinkers would make it here at least 160 feet thick.⁽¹⁾

A well was sunk many years ago at *Mr. Brettell's Foundry*, in Northampton; it had a depth of 170 feet, and in an account of this I saw some two or three years ago, it said the water rose to within 30 feet of the surface, and then ran away into a kind of ragstone. The so called ragstone was no doubt the Northampton Sand, and, if so, it would make the Upper Lias appear to be about 140 feet in thickness, which agrees very well with the Billing road section.

A well at *Kettering Furnaces* passes through 157 feet of the Upper Lias,⁽²⁾ though Mr. Sharp gives the thickness of the Upper Lias there as 176 feet.

I have two sections of the well at *Berry Wood Asylum, near Duston*; they were given to me by different persons, and, as it will be seen, differ a little in the thickness given to the Upper Lias, in other respects they agree well.

SECTIONS OF WELL AT BERRY WOOD.

	<i>First.</i>	Ft.	In.	<i>Second.</i>	Ft.	In.
	Clay (Oolitic), about ...	20	0			
<i>Inferior Oolite.</i>	{ Sand—50 ...	86	0	Old well ...	109	0
	{ Sandstone—30 to 36 ...					
	{ Blue greasy stone ..	3	0	Green rock ...	4	0

(1). See "Notes on Local Geology," Vol. ii., page 203; also, "Account of the late Boring on the Kettering Road, Northampton," by J. Euston, C.E., F.G.S., F.M.S.

(2). "Notes on Local Geology," Vol. i., page 290.



FOX HILL, NEAR DAVENTRY.

			Ft.	In				Ft.	In.
<i>Upper Lias</i>	Blue clay ...	...	190	0	Clay ...	...	178	0	
	Marlstone ...	...	3	0	Marlstone	...	2	0	
		About	302	0		About	293	0	

It is difficult to know how to interpret these sections ; possibly in the second section the bottom bed described as Marlstone may have been the cephalopoda bed ; the same explanation might account for the variation at Kettering.

I do not know of any complete sections eastward of the localities already given, but to the west of them the Upper Lias gets rapidly thinner, for, according to the Memoirs of the Geological Survey.* At *Daventry*, situate less than 12 miles from Northampton in a direct line, the Upper Lias is only 35 feet thick. In a south-westerly direction from Northampton it thins less rapidly, for according to the same authority a well was sunk in it to a depth of between 120 and 130 feet at *Towcester*, and this did not include the upper beds. I think, however, there must be some mistake in this matter, for according to a report on the Water Supply of Towcester, by Mr. J. Eunson, F.G.S., in June, 1882, there are at least 12 wells in Towcester getting water from the Marlstone, which latter is found at a depth of from 80 to 90 feet from the surface, and in some cases as much as 30 feet of Oolitic matter has to be passed through before reaching the clay. These would seem to indicate that the Upper Lias at Towcester is not more than 80 feet in thickness at most. I have seen it stated somewhere, but I cannot remember where, that Towcester Union well is 105 feet deep, and that at first the water rose 3 feet above the surface. I cannot even suggest an explanation of these differences at present, but it is pretty evident that the beds increase in thickness both eastward and south-eastward of Daventry.

Further westward still outliers of Upper Lias are common, but I know of no measurements ; it certainly does not attain to the thickness it has near Northampton. These *outliers* of the Upper Lias are almost entirely in the form of steep hills capped by the Northampton Sand. Thenford Hill, Culworth, Warden Hill, Eydon, Preston Capes, Arbury Hill, Burrow Hill, and numerous others might be given as instances. The drawing which accompanies this paper was made for me by my friend Mr. Harris Brown, and it represents two of these hills south of Daventry ; the one to the right is Fox Hill, and the one to the left is just the end of a longer ridge which has no distinguishing name in the Survey maps. Newnham windmill is situated at the top of it.

* Description of Quarter Sheet, No. 53, S.E.

INCLINATION.

The dip of the Upper Lias Beds in Northamptonshire, like that of most of the stratified rocks throughout the country, is towards the south-east. One might naturally infer that the inclination of the beds would materially affect the direction of the watercourses, and it appears to have done so; the majority of the streams having a direction varying between south and east. The inclination does not admit of measurement in the great mass of clay, but it can be shown in other ways to be rather considerable in some cases. At *Brington Grove* for instance the Upper Lias is at a good height, and six miles further east it is on a level with the river Nen.⁽¹⁾ By referring to the Geological map of the district it will be seen that the Upper Lias clays vary very little in breadth throughout the various valleys, and as has been pointed out by Mr. T. Aveline, F.G.S., "most of these valleys have a considerable slope, so that if the beds were horizontal a much greater thickness of them would be exposed at the mouths of the valleys than in their upper parts. But this is not the case, showing that the beds must have the same dip or slope as the valleys themselves, the explanation of which is that the brooks have merely removed the overlying sands, and now flow over the top beds of the clay, the toughness of which has a tendency to resist any further denudation." Mr. Aveline particularly mentions a brook which rises near to Maidford and joins the Tove; the valley in which it runs has a considerable slope and a length of about four miles, and yet the brook flows over nearly the same beds from one end of it to the other.

Speaking generally, the Upper Lias hills have a gentler slope to the east than to the west, because the clay resists denudation better in the direction of its dip than when the edges of the beds are exposed. This is fairly well seen in the drawing accompanying this paper.

CONDITIONS OF DEPOSIT.

I tried to show in a previous paper in this Journal (Vol. ii., page 239). that the land was gradually rising in England during the Middle Lias period, and that at the close of this period, marked by the deposition of the rock-bed, a halt was made which permitted of the development of a highly interesting, but thin deposit in the Midland counties, named by my friend Mr. Walford the "*Transition bed*."⁽²⁾

(1). "Memoirs of Geological Survey"—Description of Quarter Sheet, No. 53, S.E., by Mr. T. Aveline, F.G.S., and Richard Trench, B.A., F.G.S.

(2). I have since seen this bed possessing the same characters and position just above the rock-bed, on the coast of Dorsetshire, near to Eype's mouth. It is well described by Mr. Day in the Quarterly Journal of the Geological Society for August, 1863, under the name of the *Pleurotomaria* bed. Further, since visiting the Dorsetshire coast I have found a section in Northamptonshire—near to Watford—possessing characters much closer to the Dorsetshire ones than any I have described or had before seen.

A depression over a wide area seems to have followed this, giving rise to the conditions under which the Upper Lias was deposited. *The lowest beds* in this and several other counties show evidence of estuarine conditions, and of recently submerged land, in the numerous remains of terrestrial insects, and the frequent occurrence of well preserved wood; though the evenness of the deposit of the paper shales and insect limestones, and the absence of pebbles or foreign matter generally, seem to indicate that the depression was not a violent one.

The greater portion of the Upper Lias is a distinctly marine formation; it contains marine mollusca—ammonites, belemnites, &c.,—in abundance, and such salts as are commonly found in sea water; also the evenness of deposit and fineness of the matter composing it show that it was sufficiently far from land to be without the influence of littoral conditions, though other considerations point just as conclusively to its comparative nearness. Thus many of the animals found in it, such as the Plesiosaurus and Ichthyosaurus, are supposed to have lived in shallow seas or estuaries, and to have breathed air like our modern whales. It is thought too that the deposit must have been pretty rapid, owing to the excellent preservation of some of the saurian remains, and even of their coprolites, but these things could not have been quickly covered up unless the land supplying the sediment had been fairly near. Wood too is pretty abundant throughout the Upper Lias, and when converted into jet, as it commonly is in Yorkshire, an article of considerable value. It is considered that the sea was never very deep, because to account for a deep sea it would be necessary to assume a greater submergence of the land than apparently took place.

The sandy beds at the top of the Upper Lias point distinctly to littoral conditions, brought about no doubt by a general upheaval of the formation.

Prof. Ramsay considers that the Liassic and Oolitic formations were sediments laid down in warm seas surrounding an Archipelago, of which Dartmoor, Wales, and Cumberland formed some of the islands.

CHARACTERS OF THE UPPER LIAS.

The lowest beds of the Upper Lias in this county can be well identified by the *two or three layers of argillaceous limestone* nearly always present, indeed these limestones are so persistent, and their position so well defined, that in sinking operations through the Upper Lias one can almost confidently predict that the Marlstone will be met with within seven or eight feet of the first hard bed encountered.

These hard beds have had an important influence in preserving the Marlstone rock-bed in the south-west of the county, for although they do not themselves protect it particularly, they have prevented the washing away of the clay beds between them and the rock-beds in many cases, and these clay-beds have considerably preserved the stone from the action of water.

Where the rock-bed is without this capping of clay it gets very sandy, and the fossils are only casts. This is the case at Byfield, in the sections on the East and West Junction railway. Most Marlstone quarries have this thin capping of Upper Lias, as will have been noticed by the numerous sections already given in this Journal. The hard beds are not so well represented on the South Coast as in Northamptonshire, and in Yorkshire they appear to be quite absent, though the zone in which they occur is well developed.

Another character by which we can identify the lowest beds in *superficial sections* is the very *light colour* and *marly character* of the clay, characters very different to the shaley clay of the great mass of the Upper Lias. The fossils too are very characteristic, but I shall speak of these later on.

The clays I have just been describing graduate upwards into clays of a more shaley character, more ferruginous, and of a darker blue colour, that is into the "*communis*" beds, and the nature of the deposit varies very little from this point to its junction with the Northampton Sand. The "*communis*" and "*Leda ovum*" beds give a stiff blue clay capable of holding back water, and as it commonly forms the basement of the valleys in this county, floods are frequent. The soil they form is cold and tenacious, and is more fitted for, and more commonly used for pasture than tillage, being generally thrown into high ridges for the sake of surface drainage. I believe timber does very well on these clay lands.

Odour. The Upper Lias shales, like most other clays, give off an *earthy odour* when breathed upon in the dry condition. This might be thought to be due to the actual displacement of particles of clay, but that blowing on to it scarcely develops the odour. Moistening the clay will bring out the odour well, so that in all probability it is the moisture in the breath which develops it. The difference in temperature between the clay and the expired air would be greater when the clay is breathed upon than when blown upon, and this seems to offer a sufficient explanation of the condensation of moisture in one case and not the other.

The Fish and Insect limestones, and some of the pyritous nodules throughout the Lias give out a *fætid odour* when freshly broken. In the Insect limestones the animal remains must be credited with the odour, because iron pyrites seems particularly absent. In most cases iron pyrites gives off a sulphurous odour peculiar to itself when broken, the fætid odour only being developed when the pyrites is undergoing decomposition.

The Colour of the great mass of the Upper Lias clay, and of all of it when first exposed, is a *blue* or *blue-grey*. It is due to the iron in it being in the *protoxide* form. On exposure, the joints and surfaces often get very red, from the fact that the iron in such situations changes to the *peroxide* form. The same change explains the production of a red brick from a blue clay.

Behaviour in dry and wet condition. When a piece of dry clay is wetted it swells up considerably, and then crumbles to a fine powdery mass, and this is the best method of getting some of the smaller fossils from it, especially the foraminifera, and the minute gasteropods with which it abounds. When thrown into the fire in a thoroughly dry condition it breaks up with rather sharp detonations.

Owing to the property of expanding when wetted and contracting when dry, clay lands generally crack deeply in dry weather.

Composition and impurities. The Upper Lias clay consists essentially of *silicate of alumina*, but mixed with it are a number of substances, such as *sand, lime, iron, carbon, and mineral alkalies*, etc., which give to the clay a particular character.

Besides these substances—which are met with almost everywhere in the clay—a number of other things are disseminated through it, the chief of which are referred to below.

Calcareous nodules abound almost everywhere, particularly above the "*Serpentinus*" zone. The nodules are of various sizes, some very small, and some as much as a man can lift; one at Kettering weighed 3 cwt. When these nodules are large they are often *septarian*, the septa being filled in with *calc-spar*; or they may be made up largely of iron pyrites. They very commonly contain fossils. These *argillo-calcareous nodules* have been used successfully in the preparation of *Roman and other cements*, indeed they are often called "*cement stones*." A cement made from pure limestone would require contact with dry air to set properly, but cements made from these argillo-calcareous nodules have the property of setting in moist air, or even under water, hence they are called *Hydraulic cements*. It is generally considered that 15 to 25 per cent. of a limestone should consist of silicate of alumina, in order to produce a good hydraulic lime.*

Iron pyrites (sulphide of iron) is a very common mineral in the Upper Lias of Northamptonshire, especially in connection with ammonites and other fossils, or nodules; sometimes the fossils are entirely converted into this mineral. The word pyrites means fire stone, and has been given to the mineral either from the fact that it is hard and will strike fire when struck with a hammer, or from its proneness to decomposition with evolution of much heat. The variety of iron pyrites which is most prone to this spontaneous decomposition is of a lighter colour than ordinary pyrites, and is named *Marcasite*.

The iron pyrites is probably produced in this way:—Decaying organic matter first decomposes the sulphates of the sea water, setting free sulphur and sulphuretted hydrogen, and these in contact with water or mud

* Prof. Ansted's "Applications of Geology to the Arts and Manufactures."

containing iron form the sulphide of iron. It has been demonstrated within the last year, by Etard, that at least three algæ—*Beggiatoa*, *Oscillaria*, and *Ulothrix*—have the power to reduce sulphates, and liberate sulphur and sulphuretted hydrogen, whilst in the *living* condition.

Under certain conditions of moisture and air iron pyrites undergoes spontaneous decomposition, oxygen is rapidly absorbed, and the sulphide of iron converted into the sulphate of iron. After this change the iron is often displaced from the sulphuric acid by alumina and potash, and so forms an *alum*, or by calcium to form *gypsum*, both of which are hydrous sulphates.

This absorption of oxygen and the subsequent changes may take place slowly, and without noticable heat, but in situations by the sea shore where fresh portions are at times suddenly exposed to the action of moisture and air, a spontaneous combustion of the rock often takes place. This has happened at Charmouth, in Dorsetshire, and on the coast of Yorkshire, and Messrs. Tate & Blake mention Staithes and Lofthouse as places where the bituminous shales have been set on fire by this process, and have burnt for years.

Alum. The kind of action described above often produces an efflorescence of sulphate of alumina, or of sulphate of alumina and potash (potash alum), and rocks exhibiting this will generally yield a good supply of alum by a proper treatment. Alum at one time was obtained almost exclusively from the Yorkshire coast, in the neighbourhood of Whitby, but it is now made chiefly from coal shale—the ammonia from the gas works taking the place of potash and so forming ammonia alum. In consequence of this the alum works of the Yorkshire coast are deserted. So far as I know alum has never been manufactured from the Northamptonshire shales, but I suppose it could, for I have several times noticed this efflorescence on pyritous shales that have been kept for some time in a rather damp place. Iron pyrites alone will often give an efflorescence closely resembling the sulphate of alumina in appearance, but this has a nauseous taste quite different to the astringent taste of an alum. Since I commenced writing this paper, I have prepared fairly pure crystals of potash alum from some of the decomposing shales, by the addition of a little sulphate of potash; but in one or two cases the crystals were tinged green with sulphate of iron, and although they had the strong styptic taste of an alum, they had also the nauseous one of sulphate of iron. Green crystals of sulphate of iron are easily produced by treating decomposing iron pyrites with water, and then evaporating the the solution to a small bulk.

Gypsum, the other hydrated sulphate that may be formed by the decomposition of iron pyrites in a clay, is a mineral very commonly met with in Northamptonshire, and so far as my own experience goes it is much more common here than it is in Yorkshire or Dorsetshire. When gypsum is



SELENITE



SELENITE



NAIL-HEAD SPAR



NAIL-HEAD SPAR



S. Brown

calined its water of crystallization is driven off and *Plaster of Paris* formed. It re-absorbs water, but cannot be again brought back to its original crystalline form, or be used a second time for cement. The transparent form of gypsum—the variety almost always found in Northamptonshire—is called *selenite*, and it may be split into very thin plates by pressing a knife, or even the nails, to the apex of the crystals in a particular direction. Gypsum has numerous applications when found in sufficient quantities; it is used for glazing porcelain, in the manufacture of glass, as a mortar, and as a manure. I have only once found the crystals of selenite white and opaque, this was at the Vigo brickyard, near Northampton. I should think in this case they must have been heated by the rapid decomposition of iron pyrites in the clay. A moderate amount of heat will convert the ordinary transparent crystals into this form.

Bitumen or Naphtha is a common product of the Yorkshire Lias. The shale containing this will burn with a clear white light. I have picked up pieces of this at Saltwick Nab which gave out a very strong odour of naphtha when split open. Naphtha is the most liquid form of bitumen, and as much as ten gallons of oil may be distilled from a ton of shale. I believe there is nothing like this in Northamptonshire or the Midland counties.

Jet is met with in considerable quantities in the lower portion of the Upper Lias near to Whitby, in Yorkshire; it is rather valuable because largely used in the manufacture of ornaments. Thin sections of jet show that it is coniferous wood. Prof. Ramsay says it is formed of the fossilized stems of coniferous trees that grew on the hilly islands to the N. and W.

I have several times found wood in the Upper Lias of Northamptonshire, very black, but so soft and crumbly that I should hesitate to give it the dignified title of jet. I notice Prof. Judd frequently mentions jet as occurring in this formation a little north of the district particularly referred to in this paper, so there is no reason why we should not find it; he says the jet is soaked in oil to prevent cracking, and then used by the workmen and others for whetting razors.

Crystallized Carbonate of Lime is not common in the Upper Lias clays, indeed I might say it is rare. It is sometimes found in the nodules, and in the fossils of the limestone beds at the base. I have found it in several places where it cannot be high up in the formation, although above the "*Serpentinus*" beds, so that I have got to consider it as characteristic of the lower portion of the communis beds. The calc-spar in these situations takes the peculiar *cone-in-cone* structure so common in the coal measures, the form that was at one time called *cone-in-cone coral*. The crystals start as it were from a point and radiate from it, forming a hollow cone within which other crystals may be developed; on this account it is sometimes called *radiating-spar*. Several of the cones usually have a common base, and form a

number of concentric circles; the middle cone will generally come out easily, and sometimes others; these characters have caused it to receive the name of *nail-head-spar*.

These cones which do not terminate in the common base, finish at the side of the block in which they occur, and being more resisting than the clay in which they are developed, the sides generally get a peculiar corrugated surface, looking very much like ripple marks. In one case—at Weedon—I found the same structure developed, but the crystals had entirely disappeared; leaving very pretty star-like cavities in the clay. The clay was very ferruginous, and so soft that I found it necessary to soak it in thin glue in order to preserve it.

USES.

Brickmaking. The chief and almost only use made of the Upper Lias clay in Northamptonshire is for the making of bricks and drain pipes, but for these purposes it is very extensively used. It gives a red brick, which Mr. Sharp says is not remarkable for the colour or quality of the material, and I will not venture to contradict this statement.


When too much iron, lime, potash, or soda is present in a clay, it causes the bricks to run into glass when exposed to the heat of the kiln. This is only occasionally seen in bricks from this neighbourhood.

Brickmakers are very careful to exclude from the clay, as far as possible, all the *fossils*, *nodules*, and *selenite*. The two former would burn to lime in the kiln, and the latter to Plaster of Paris, and even though the brick might not run, or be broken-up in the kiln, on exposure to the weather, moisture would be absorbed, and the heat and expansion produced by this would split the brick in pieces, for although the bricks differ so much from the clay in having lost plasticity and the capacity to mix with water, they are still very porous.

In most brickyards where hand labour only is employed, the clay is dug in the winter time, and exposed as much as possible to the frost, which crumbles it down to a fine condition. This tempering of the clay very much improves it for the production of bricks and tiles. In steam brickyards the clay is freed of the nodules, fossils, etc., as far as possible, whilst being dug, and is then ground up into a proper condition by machinery. It is then mixed with water, moulded, and dried again before entering the kiln.

Sand or ashes, etc., are mixed with the clay as a necessity in many brickyards, but I have seen them used very little in Northamptonshire, from which I conclude they are not necessary.

I have to thank Mr. Harris Brown for the drawings which accompany this paper.



A LIST OF THE BIRDS OF THE BANBURY DISTRICT.

BY F. C. APLIN, B.C.L., REV. R. D'O. APLIN, B.A., AND
OLIVER V. APLIN.

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108.—*EDICNEMUS CREPITANS*. *Temm.* Great Plover. A specimen was shot at Great Bourton in May, 1871, and is now in our collection.

109.—*CHARADRIUS FLUVIALIS*. *Linn.* Golden Plover. Large flocks are sometimes seen in winter; rarely in the meadows, more generally flying over; specimens are not unfrequently obtained.

110.—*VANELLUS CRISTATUS*. *Meyer.* Lapwing. Resident and common, nesting on the fallows and in rough meadows. In autumn they collect in flocks, their numbers being considerably augmented by immigrants. During very severe weather they leave us entirely.

111.—*ÆGIALITIS HIATICULA*. *Linn.* Ringed Plover. Mr. Prior records a specimen killed near the canal some few years back.

112.—*STREPSILAS INTERPRES*. *Linn.* Turnstone. Two specimens have been procured near Banbury, one in 1860, the other in 1874.

113.—*HÆMATOPUS OSTRALEGUS*. *Linn.* Oyster-catcher. One was shot near Bourton in September, 1852, and another at Croughton in 1864.

114.—*TOTANUS GLOTTIS*. *Pall.* Greenshank. Mr. Prior has recorded the occurrence of two or three specimens near Banbury.

115.—*TOTANUS CALIDRIS*. *Linn.* Redshank. Specimens have been procured at Helmdon and on the River Cherwell some years ago.

116.—*TOTANUS OCHROPUS*. *Linn.* Green Sandpiper. An occasional visitor in autumn and early winter. It is found along the streams sometimes as early as the middle of August.

[*TOTANUS GLAREOLA*. *Linn.* Wood Sandpiper. In the "History of Banbury" List this bird is included as "an occasional visitant." It is submitted that in this case there must have been an error in the identification of the species. As the Green Sandpiper is not mentioned it is probable that the two species were confused.]

117.—*TOTANUS HYPOLEUCUS*. *Linn.* Common Sandpiper. A regular spring and early autumn visitor in small numbers, staying but a short time.

118.—*TRINGA ALPINA*. *Linn.* Dunlin. This species is recorded from Wickham (in 1872) and Sibford.

119.—*TRINGA MINUTA*. *Leish*. Little Stint. This species is recorded in the "History of Banbury" List on the authority of Mr. Godfrey.

120.—*PHALAROPUS FULICARIUS*. *Linn*. Grey Phalarope. Specimens have been procured at Bloxham and South Newington; a fine one was shot on the Cherwell at Franklin's Knob in the winter of 1876.

121.—*SCOLOPAX RUSTICOLA*. *Linn*. Woodcock. An autumn and winter migrant; never plentiful and exceedingly local and uncertain in its distribution.

122.—*GALLINAGO MAJOR*. *Gmel*. Great Snipe. This species is recorded from Warkworth more than 20 years ago.

123.—*GALLINAGO MEDIA*, *Leach*. Common Snipe. An autumn and winter migrant. The first flight is sometimes early in September. They appear to be constantly on the move; their numbers and stay depend on the state of the meadows—being most abundant when a flood has just gone off. We have observed them in every month of the year except May and June.

124.—*GALLINAGO GALLINULA*. *Linn*. Jack Snipe. An autumn and winter visitor; never very plentiful and seldom arriving before the second week in October. In 1879 (as recorded in the *Field*) we procured a specimen on the 24th September.

125.—*LIMOSA LAPPONICA*. *Linn*. Bar-tailed Godwit. Mr. Prior says, "Sometimes heard flying over in flocks at night, and three specimens have been shot."

126.—*NUMENIUS ARQUATA*. *Linn*. Common Curlew. Specimens have been procured at Adderbury, Anyhoe, and Deddington. We have an example shot from a party of five near Williamscoate a few years ago.

127.—*NUMENIUS PHŒOPUS*. *Linn*. Whimbrel. Several specimens of this bird have been shot, generally in spring.

128.—*ARDEA CINEREA*. *Linn*. Common Heron. This fine bird may often be met with in the meadows at all times of the year. During the winter months they are always to be seen, often several together.

129.—*NYCTICORAX GRISEUS*. *Linn*. Night Heron. Recorded in the "History of Banbury" List as "Rare."

130.—*BOTAURUS STELLARIS*. *Linn*. Common Bittern. Specimens are on record from the Cherwell (in 1860) and from Cropredy. Mr. Holbech has in his possession a fine bird killed at Farnborough some years ago, and we have been informed of two or three other occurrences within the last 20 years.

131.—*ARDETTA MINUTA*. *Linn*. Little Bittern. A specimen was procured on the Cherwell, near Banbury, on the 27th October, 1857, and is still in existence.

132.—*RALLUS AQUATICUS*. *Linn*. Water Rail. This bird is no doubt

a resident, but it is seldom seen except during a hard frost. We have never found the nest.

133.—*CREX PRATENSIS*. *Bechst.* Land Rail. A summer migrant and common. Instances of its occurrence during the winter months are on record.

134.—*PORZANA PARVA*. *Scop.* Little Crake. An example was shot at Cropredy.

135.—*PORZANA MARUETTA*. *Leach.* Spotted Crake. A spring and autumn visitor ; not very uncommon in autumn. In September, 1879, we examined an immature specimen procured on the Cherwell, near Hardwick, where it was believed the species may have nested. We think it possible that this bird may occasionally breed here.

136.—*GALLINULA CHLOROPUS*. *Linn.* Moorhen. Resident and common.

137.—*FULICA ATRA*. *Linn.* Coot. Resident. Very numerous on Clattercutt Reservoir, where we have observed as many as thirty adult birds on the open water at once. In autumn and winter it is rather more generally dispersed, and may then be met with on the brooks and rivers, where it *may possibly* breed. It also breeds on the pools at Farnborough.

138.—*CYGNUS* ——— *SP.* Swan. Swans have been several times observed flying over. These may have been *C. musicus* (*Beck.*), or *C. bewicki* (*Yarrel.*), or, of course, possibly only *C. olor* (*Gmel.*)

139.—*ANSER CINEREUS*. *Meyer.* Grey Leg Goose. Recorded in the "History of Banbury" List as "Migratory."

140.—*ANSER SEGETUM*. *Gmel.* Bean Goose. Recorded in the "History of Banbury" List as "Migratory." Small flocks of grey wild Geese are at times put up from the stubbles and young wheat, and they are not very uncommonly seen on the floods and flying over. Although it is impossible to say with any certainty, it is probable that they belong to this species.

141.—*ANSER BERNICLA*. *Linn.* Brent Goose. One of these birds is reported from Overthorpe a few years ago. Another was shot at Warkworth in February, 1871, as we are informed by Mr. Wyatt.

142.—*ANSER CANADENSIS*. *Linn.* Canada Goose. An example of this fine species was shot on the Cherwell, near Banbury, a few years ago.

143.—*TADORNA CORNUTA*. *Gmel.* Sheldrake. One of these birds was recorded in the local paper as having been shot at Hook Norton in the winter of 1880,

144.—*ANAS BOSCHAS*. *Linn.* Wild Duck. Resident. Breeding in some numbers on one or two of the larger pieces of water in the district ; a pair may also be found here and there along the river and streams. Always more numerous during the winter months, and in some seasons very large numbers visit the water meadows.

145.—*SPATULA CLYPEATA*. *Linn.* Shoveller. A male bird was shot some sixteen years ago at Aynho, and in December, 1881, a female was procured at the same place.

146.—*MARECA PENELOPE*. *Linn.* Wigeon. A winter visitor. In some seasons very large flocks visit us, in others very few come. They do not arrive until late in the season, and we have seen them in some numbers as late as the first week in March.

147.—*QUERQUEDULA CRECCA*. *Linn.* Teal. A winter visitor; never very plentiful, but haunting the secluded streams singly or in pairs all the season. We have occasionally seen as many as eight or ten together. They arrive early in October and stay until March.

148.—*QUERQUEDULA CIRCIA*. *Linn.* Gargany. One of these beautiful little ducks is on record as having been procured at Byfield. We remember seeing two specimens a few years ago which had been procured in the neighbourhood, but we cannot recall the locality, neither can the stuffer who preserved them.

149.—*FULIGULA FERINA*. *Linn.* Pochard. A winter visitor, but very far from common. We have recorded in the *Zoologist*, 1882, p. 74, the curious capture of one of these birds in December, 1881, which dashed itself through a skylight in Banbury.

150.—*FULIGULA MARILA*. *Linn.* Scaup. One of these ducks was shot on the canal some few years ago.

151.—*FULIGULA CRISTATA*. *Leach.* Tufted Duck. An example was procured at Aynho some years ago. In December, 1878, a fine male bird was captured on Clattercutt Reservoir, and is now in our collection.

152.—*CLANGULA GLAUCION*. *Linn.* Golden Eye. Several of these birds have been shot at different times during the winter season. A female, procured near Cropredy, 18th January, 1881, is now in our collection.

153.—*MERGUS SERRATOR*. *Linn.* Red-breasted Merganser. Mr. Prior has recorded a specimen of this bird shot by a man living at Byfield.

154.—*MERGUS MERGANSER*. *Linn.* Goosander. Several of these birds have been procured. It has occurred at Byfield, Adderbury, and Edgcote [1876-77]. A fine adult male in our collection was shot on Wormleighton Reservoir some four or five years ago.

155.—*COLYMBUS GLACIALIS*. *Linn.* Great Northern Diver. An example was shot on one of the ponds at Wroxton Abbey some years ago.

156.—*COLYMBUS SEPTENTRIONALIS*. *Linn.* Red-throated Diver. Mr. Wyatt informs us that he had a specimen of this diver from Over Warton a few years ago.

157.—*COLYMBUS ARCTICUS*. *Linn.* Black-throated Diver. Mr. Wyatt informs us that specimens of this bird have been obtained at Fenny Compton in January, 1877, and at Clattercutt.

158.—*PODICEPS CRISTATUS*. *Linn.* Great Crested Grebe. To Mr. Hugh Holbech we are indebted for the discovery of a present breeding haunt of this species. He informs us that in July, 1880, he saw an old bird accompanied by three young on Clattercutt Reservoir. In August, 1882, we accompanied him to the spot and observed two pairs of old, and four young birds, two of which were only half grown, and were still with the old birds. A specimen was procured at Grimsbury in 1862. Another, a male in probably its second year, was captured alive in a field at Prior's Marston in September, 1881. We have heard of one or two other instances of its occurrence.

159.—*PODICEPS GRISEIGENA*. *Bodd.* Red Necked Grebe. Mr. Prior has recorded a specimen shot on the canal feeder. It is included in the "History of Banbury" List, on the authority of Mr. Abbott, as "an occasional visitant, very rare."

160.—*PODICEPS AURITUS*. *Linn.* Eared Grebe. Mr. Prior records this species as having been procured on the river Cherwell. Mr. Wyatt informs us that a specimen was procured at Clattercutt twenty years ago by Mr. Judge—this *may* possibly have been *P. cristatus*.

161.—*PODICEPS FLUVIATILIS*. *Tunstall.* Little Grebe. Resident, and fairly common on the river, canal, and larger pieces of water. They are fond of haunting the mouths of the larger overgrown ditches running into the streams.

162.—*FRATERCULA ARCTICA*. *Linn.* Puffin. A specimen of this eminently coast bird was shot at Culworth some years ago.

163.—*ALCA TORDA*. *Linn.* Razor-bill. At the beginning of the frost in December, 1878, we examined an example of this bird captured at Clattercutt Reservoir. It is now in the possession of a gentleman at Bodicote.

164.—*LOMVIA TROILE*. *Linn.* Guillemot. Mr. Spiers, of Banbury, has in his possession a specimen which was caught a few years ago on a night line set in the river near Aynho.

165.—*PHALACROCORAX CARBO*. *Linn.* Cormorant. A fine specimen, weighing 6½ lbs., was shot on Clattercutt Reservoir, in November, 1879. We have heard of another in the district, but cannot learn the locality.

166.—*PHALACROCORAX GRACULUS*. *Linn.* Shag. In December, 1880, we examined a specimen which had been shot while sitting on the ridge of a barn roof at Souldern (vide *Zoologist*, 1881, p. 211). It has been noticed that when this and the last mentioned species come inland they are generally observed to alight on elevated positions, such as church steeples, tall chimneys, and the like. Early in the present autumn (1882) a large bird was one day observed sitting on the weather vane of the Parish Church in Banbury. Harvest time (as noticed by Dr. Plot, *Nat. Hist. Oxon.*) is t

time in which "the cormorant has been observed to come hither," and although we were not fortunate enough to see it ourselves, nor are we aware of anyone having identified it, we cannot help thinking that the bird seen was a Shag or Cormorant.

167.—*SULA BASSANA*. *Linn.* Gannet. We believe that several Gannets have been shot in the district, but have not been able to obtain satisfactory information respecting them all. Many years ago the old Thenford carrier had one alive which he used to exhibit in Banbury on market days. We have been informed of a specimen in immature plumage shot by the river Cherwell, near Banbury, in 1877.

168.—*STERNA FLUVIATILIS*. *Naum.* Common Tern. This bird occurs not very uncommonly, generally in spring.

169.—*STERNA MACRURA*. *Naum.* Arctic Tern. We have seen one or two of these Terns which had been procured in the neighbourhood of Banbury.

170.—*HYDROCHELIDON NIGRA*. *Linn.* Black Tern. Mr. Prior records one "shot in the winter of 1869 on some floods." We have seen an example which Mr. Wyatt informs us was shot at Hempton.

171.—*LARUS RIDIBUNDUS*. *Linn.* Black-headed Gull. This species is occasionally procured here. We have examined several specimens within the last two or three years.

172.—*LARUS CANUS*. *Linn.* Common Gull. Not an uncommon visitor, generally in the winter and early spring months. We have, however, observed it in May.

173.—*LARUS ARGENTATUS*. *Gmel.* Herring Gull. Mr. Prior records one of these fine Gulls shot at Swerford in 1876, and Mr. Wyatt tells us he has had one or two others sent in from this district.

174.—*LARUS FUSCUS*. *Linn.* Lesser Black-backed Gull. This and the last-mentioned species are included in the "History of Banbury" List as occasional visitors on the authority of Mr. Abbot. A specimen was procured on the river Cherwell, near Banbury, some years ago, and in September, 1882, we examined a nearly adult bird shot at Farthinghoe.

175.—*RISSA TRIDACTYLA*. *Linn.* Kittiwake. Occasionally procured during the winter season, but not so frequently as the other smaller Gulls.

176.—*STERCORARIUS CATARRHACTES*. *Linn.* Common Skua. In the *Zoologist* for 1879, p. 490, we have recorded a specimen procured at Eydon in October of that year.

177.—*STERCORARIUS CREPIDATUS*. *Banks.* Richardson's Skua. An example in our collection was shot at Milcombe on the 15th of October, 1879 (vide *Zoologist*, 1879, p. 490). This specimen and that of the Common Skua mentioned above were doubtless stragglers from the ranks of the hosts of Skuas which arrived on our coasts during the great immigration of the autumn of 1879.

178.—PUFFINUS ANGLORUM. *Temm.* Manx Shearwater. Mr. Goatley, of Chipping Norton, captured one of these birds alive in September, 1839, (vide *Zoologist*, 1839, p. 2625). Mr. Prior has recorded a specimen in his possession taken alive at Chipping Norton in the winter of 1872-3; also two other occurrences, one at Chacombe, the other at Wroxton (vide *Zoologist*, 1879, p. 457).

179.—PROCELLARIA PELAGICA. *Linn.* Stormy Petrel. Mr. Wyatt tells us that he has twice had specimens of this little sea-loving bird, both many years ago. One of them was procured at Upton.

180.—PROCELLARIA LEUCORRHOA. *Vieill.* Leach's Petrel. Early in December, 1881, we examined a specimen of this bird which had been picked up at Lower Heyford a few days before. Many of these birds visited the English coasts about that time; our bird was probably blown inland by the storm at the end of November. In *Loudon's Mag. Nat. Hist.*, p. 282-283, a specimen is recorded as procured at Chipping Norton.

ADDENDA.

79.—It should be stated that there is no previous record of this species in Great Britain, and that with regard to the specimen procured at Broughton, it is the opinion of several ornithologists that it was an escaped bird.

124.—As an earlier arrival of the Jack Snipe than that recorded in the body of the list, it may be mentioned that an example was brought to us on the 15th September, 1882, which had been shot on the Cherwell, opposite Bodicote.

128.—Mr. H. Holbech was informed by one of the woodmen that some years ago a pair of Herons built their nest in Mollington Wood; unfortunately the tree they selected was cut down.

130.—Mr. Beesley has kindly furnished us with some extracts from his note books relating to rare birds procured in the district. From one of these it appears that a Bittern was shot at Clattercutt about 17th December, 1847.

157.—The Black-throated Diver procured at Clattercutt was shot on January 31, 1849, and was immature (Mr. Beesley).

167.—“A flock of Gannets passed over the town—one found next morning.”—*Banbury Guardian*, 25th February, 1845 (Mr. Beesley).

METEOROLOGICAL REPORT AND OBSERVATIONS, 1883.

OCTOBER.

THE fine bright weather of this month, with the few light showers which fell, has enabled the farmer to get in the seed under most favorable circumstances—a great part of which was done by the end of the month. The mean temperature of the month, 49°, was slightly above the average. The rainfall was very light, registering only 1·49 in., or 0·93 in. below the average of the last 14 years. The barometer varied from 30·30 ins. to 29·10 ins. during the month. Heavy fogs occurred in the early part of the day at intervals from the 8th.

NOVEMBER.

November, 1883, will be remembered for its extraordinary and magnificent sunrises and sunsets, which were visible during the month. Whether they are the result of the earthquake at Java, according to the theory of Mr. Norman Lockyer and Mr. G. J. Symons, or from other causes, it is at present impossible to state with any certainty.

The Rev. H. Waller, of Twywell Rectory, writing on this subject, says “Those who witnessed the sunset of the 26th will record it as one of the grandest phenomena ever witnessed in this or any other clime. The prolonged twilight—the extraordinary colouring of an atmosphere which seemed luminous in every quarter—the transitions from blue to green, and from yellow to rose colour—were enchanting; whilst buildings in the near foreground took tints and shadows never imagined possible before. In a lesser degree these beautiful sunsets, together with abnormally lovely sunrises, prevailed to the end of the month.”

The month was generally dull and wet, with a great deal of fog, and a few intervals of bright sunshine; the rainfall was heavy, registering 2·64 ins., or 0·21 in. above the average for the last 14 years.

The barometer varied considerably, ranging from 29·70 ins. on the 6th to 30·15 ins. on the 29th. The mean temperature, 42°, was about the average. Shewing the mildness of the month, Lady Knightley writes,—“Ripe strawberries with a good deal of flavour were gathered in open borders on the 6th, and roses continued to bloom throughout the month.”

DECEMBER.

December was a remarkably dry month, only 0·60 in. of rain being registered, against 2·13 ins., the average of the last 14 years. The mean temperature was rather above the average, the maximum registered being 54° on the 13th and 14th; the minimum being 27° on the 7th; the thermometer only fell below freezing point on six nights during the month. Snow fell on two days only. Heavy fogs prevailed from the 25th to the 29th. The barometer varied very much, ranging from 30·35 ins. on the 7th to 29·40 ins. on the 15th. The extraordinary sunrises and sunsets were visible at intervals during the month.

F. LAW.

OCTOBER, 1883.

STATION.	OBSERVER.	RAINFALL.					SHADE TEMPERATURE.				
		Total for Month.	Total for Year.	Greatest Fall.	Wet Days.	Maximum.		Minimum.			
						In.	Date.	Deg.	Date.	Deg.	Date.
Northampton ..	H. Terry	1.63	24.36	0.44	15	13	58	8 & 14	57	15	
" ..	F. Law	1.49	23.90	0.29	15	12	65	8	34	21	
Castle Ashby ..	R. G. Scriven	1.72	23.85	0.27	16	15	62	11	36	24	
Pitsoford	C. Markham	1.66	25.76	0.27	15	18	65	8	36	7	
Rothwell	J. More, M.D.	1.45	24.81	0.26	3	12	..	..	..	..
Oundle	S. P. Holloway	1.72	24.69	0.55	14	16	..	..	..	..
Towcester	J. Webb	2.17	25.69	0.52	15	12	..	..	..	..
Little Houghton ..	J. Brawn	1.60	23.46	0.29	15	13	54	25	23	22	
Fawsley	Lady Knightley	2.05	23.87	0.45	15	14	60	8	25	23	
Thorpe Manville ..	Seth Barnes	2.22	26.23	0.52	15	16	..	..	..	..
Twynwell Rectory ..	Rev. H. Waller	1.76	26.84	0.36	14	18	..	..	..	..
Whittlebury	W. S. Miller	2.26	27.59	0.41	15	16	62	8	25	20	
Kettering	C. W. Lane	2.30	28.98	0.41	15	19	..	..	..	..
Holdenby	J. Gregory	1.70	26.95	0.28	14	13	..	..	..	..
Peterborough	J. Whitwell	1.59	24.90	0.65	12	14	67	9	34	4	
Average 17 years 1866-82	H. Terry	2.60	21.99	..	..	..	..	..	..	..

NOVEMBER.

Northampton ..	H. Terry	2.86	27.12	0.61	5	19	54	1	25	11
" ..	F. Law	2.64	26.84	0.62	5	19	56	28	23	12
Castle Ashby ..	R. G. Scriven	3.04	26.89	0.70	5	19	58	26	22	11
Pitsoford	C. Markham	3.05	28.81	0.76	5	17	56	28	24	13
Rothwell	J. More, M.D.	2.50	27.81	1.00	5	14	..	..	..	..
Oundle	S. P. Holloway	3.81	28.0	0.94	5	18	..	..	..	..
Towcester	J. Webb	3.43	29.12	0.59	5	18	..	..	..	..
Little Houghton ..	J. Brawn	2.93	26.89	0.61	5	21	51	25	22	12
Fawsley	Lady Knightley	2.83	26.70	0.66	5	20	52	29	25	13 & 16
Thorpe Manville ..	Seth Barnes	3.17	29.40	0.42	5	18	..	..	..	..
Twynwell Rectory ..	Rev. H. Waller	3.17	30.01	0.85	5	14	..	..	..	..
Whittlebury	W. S. Miller	3.81	31.40	0.70	5	21	55	28	25	14
Kettering	C. W. Lane	4.01	30.69	0.95	5	22	..	..	..	..
Holdenby	J. Gregory	3.67	30.62	0.80	5	21	..	..	..	..
Peterborough	J. Whitwell	3.69	28.69	0.85	5	18	55	25 & 28	30	12
Average 17 years 1866-82	H. Terry	2.20	24.14	..	..	..	..	..	..	..

DECEMBER.

Northampton ..	H. Terry	0.70	27.82	0.19	10	11	50	14	27	6
" ..	F. Law	0.60	27.14	0.17	10	13	54	13 & 14	27	7
Castle Ashby ..	R. G. Scriven	0.74	27.63	0.21	10	9	58	25	27	6
Pitsoford	C. Markham	0.87	29.68	0.28	10	15	55	13	26	7
Rothwell	J. More, M.D.	0.97	28.28	0.30	10	11	..	..	..	..
Oundle	S. P. Holloway	1.16	29.16	0.23	15	18	..	..	..	..
Towcester	J. Webb	0.85	29.97	0.22	10	11	..	..	..	..
Little Houghton ..	J. Brawn	0.76	27.15	0.20	10	14	49	14	26	7
Fawsley	Lady Knightley	0.62	27.82	0.21	10	13	51	13 & 14	26	6
Thorpe Manville ..	Seth Barnes	0.70	30.02	0.25	10	10	..	..	..	..
Twynwell Rectory ..	Rev. H. Waller	1.06	31.14	0.28	10	..	..	..	..	..
Whittlebury	W. S. Miller	0.82	33.22	0.23	15	12	53	13	23	6
Kettering	C. W. Lane	1.12	34.11	0.36	10	20	..	..	..	..
Holdenby	J. Gregory	1.04	31.66	0.28	15	12	..	..	..	..
Peterborough	J. Whitwell	0.85	29.44	0.24	16	12	53	13 & 14	28	6
Average 17 years 1866-82	H. Terry	2.28	28.12	..	..	..	..	..	..	..

HENRY TERRY, SURGEON.

A SYSTEMATIC CLASSIFICATION OF THE LEPIDOPTERA WHICH HAVE OCCURRED IN THE VICINITY OF NORTHAMPTON.

BY WM HULL AND H. F. TOMALIN.

SECTION II.—MICRO-LEPIDOPTERA.

"G" GROUP.—DELTOIDES. ^a

HYPENIDÆ.

GENERIC—FAMILY I.—HYPENA (Linn.)

Species 1...*Hypena Proboscidalis* (Linn.) *Snout-eggar likeness*

HERMINIDÆ.

GENERIC—FAMILY II.—HERMINIA (Hübner.)

„ 1...*Herminia Cribalis* (Hübner.) *Dotted fan-foot*

"H" GROUP.—PYRALIDES.

PULVERULENTÆ.

GENERIC—FAMILY I.—PYRALIS (Linn.)

„ 1...*Pyralis Farinalis* (Linn.) *Meal Moth*

LURIDÆ.

GENERIC—FAMILY II.—PYRAUSTA (Linn.)

„ 1...*Pyrausta Purpuralis* (Linn.) *Crimson and Gold*

„ 2... „ *Cespitalis* (Fabr.) *Straw-barred*

GENERIC—FAMILY III.—PARACOLAX (Fabr.)

„ 1...*Paracolax Nemoralis* (Fabr.) *Small fan-foot*

„ 2... „ *Tarsicrinalis* (Steph.) *Fan-foot*

GENERIC—FAMILY IV.—HYDROCAMPIDÆ (Hübner.)

GENUS I.—CATACLYSTA (Linn.)

„ 1...*Cataclysta Lemnalis* (Linn.) *Small china mark*

GENUS II.—HYDROCAMPA (Hübner.)

„ 1...*Hydrocampa Nymphæalis* (Hübner.) *Brown china mark*

„ 2... „ *Stagnalis* (Donov.) *Beautiful* „ „

GENUS III.—PHYTÆNIA (Fabr.)

„ 1...*Phytænia Sambucalis* (Fabr.) *Garden china mark*

^a The palpi of these Moths have the appearance of a forked proboscis.
Of fourteen British species of Deltoides, we have recorded two species.

GENERIC—FAMILY V.—BOTYDÆ.^a

GENUS I.—MARGARITIA (Wien Verz.)

- Species 1...*Margaritia Verticalis* (Linn.) *Mother of pearl*
 „ 2... „ *Margaritalis* (Wien Verz.) *Clouded yellow pearl*
 „ 3 „ *Sericealis* „ *Straw dot*
 GENUS II.—SCOPULA (Linn.)

- „ 1...*Scopula Olivalis* *The white brindled*

PLICATÆ.

GENERIC—FAMILY VI.—NOMOPHILA (Hübner.)

- „ 1...*Nomophila Hybridalis* (Hübner.) *Rush vaneer*

GENERIC—FAMILY VII.—EURRHYPARA.

- „ 1...*Eurrhypara Urticalis* (Linn.) *Small magpie*

“L” GROUP.—CRAMBITES.

GENERIC—FAMILY I.—CRAMBUS (Hübner.)

- „ 1...*Crambus Paleellus* (Hübner.) *Large yellow vaneer*
 „ 2... „ *Pygmaeus* (Steph.) *Pigmy* „
 „ 3... „ *Luteellus* (Wien Verz.) *Barred* „
 „ 4... „ *Margaritalus* (Steph.) *Pearl streaked* „
 „ 5... „ *Hortuellus* (Hübner.) *Garden* „
 „ 6... „ *Culmellus* (Linn.) *Small straw-coloured vaneer*
 „ 7... „ *Culmorum* (Fabr.) *Brown-edged* „
 „ 8... „ *Argentellus* (Linn.) *White satin* „
 „ 9... „ *Ericellus* (Hübner.) *Heath* „

“M” GROUP.—TORTRICES.^c

GENERIC—FAMILY I.—TORTRIX (Linn.)

GENUS I.—TORTRIX (Linn.)

- „ 1...*Tortrix Viridana* (Linn.) *Green oak Moth* ^a
 „ 2... „ *Sorbiana* (Hübner.) *Hazel tortrix*

GENUS II.—LOZOTÆNIA (Fabr.)

- „ 1...*Lozotænia Oporana* (Linn.) *Great hook-tip*
 „ 2... „ *Roborana* (Hübner.) *Oak red-bar*
 „ 3... „ *Fosterana* (Fabr.) (*Foster's*)
 „ 4... „ *Ochreana* (Hübner.) *Saffron*
 „ 5... „ *Crategana* „ *Hazel-barred*

^a These Moths receive their English name from the pearl-like gloss of their wings.

Of seventy-seven British species of Pyralides, we have recorded fifteen species.

Of eighty British species of Crambites, we have recorded in the above list nine species.

^c These insects are called Tortrices, or Twistlers, from the manner in which their larvæ generally feed—rolling up the leaf of a plant for protection, and living within the enclosure thus formed. Of three hundred and one British species of Tortrices, we have recorded 16 species.

^d This numerous species is greatly decreased in numbers by the depredations of a fly belonging to the genus *Empis*, which takes it prey and feeds on the moth while on the wing.

GENERIC—FAMILY II.—TERAS (Fabr.)

- Species*¹ .. *Teras Caudana* (Fabr.) *The mallow notch-wing*
 „ 2... „ *Effractana* (Hübner) *Common* „

GENERIC—FAMILY III.—CNEPHASIA (Curt.)

- „ 1... *Cnephasia Sinuana* (Curt.) *Waved elm*

GENERIC—FAMILY IV.—SPILONOTA (Haw.)

- „ 1... *Spilonota Trimaculata* (Haw.) *Triple blotched*

GENERIC—FAMILY V.—XANTHOSSETIA (Linn.)

- „ 1... *Xanthossetia Hamana* (Linn.) *Hook-marked straw*

GENERIC—FAMILY VI.—SERICORIS (Treit.)

- „ 1... *Sericoris Pulchellana* (Treit.) *Dark-barred grey*

GENERIC—FAMILY VII.—SEMASIA (Steph.)

- „ 1... *Semasia Weberana* (Steph.) *The Weberian*
 „ 2... „ *Pomonana* (Linn.) *Codling Moth*

GENERIC—FAMILY VIII.—SIMÆTHIS.

- „ 1... *Simæthis Lutosa* (Haw.) *Early nettle-tap*

^e The term Notchwing is derived from the deep scalloping on the front edge of the upper wing.

^f The larvæ of this insect attack most stone fruit trees, living on the inner bark, and thus cause much damage to the trees.

^g This is really a beautiful insect; but this will not compensate for the ravages the larvæ commit in apple orchards.

ORNITHOLOGICAL NOTES.

AN albino specimen of the Chaffinch—*Fringilla cœlebs* (Pennant)—has lately been obtained at Easton Maudit.

An immature specimen of the Puffin—*Mormon fratercula* (Gould)—was taken alive at Thornby, December 29th, 1883. The bird has since died.

I shot a male Green Sandpiper—*Turiga ochropus* (Pennant)—in the parish of Great Houghton, December 29th, 1883. This is unusual, as the few individuals of this species that visit the Nene valley are generally seen in the early part of August, though the extreme mildness of the season will doubtless account for this one. We have obtained specimens in 1878, 1879, 1881, all early in August.

I obtained a specimen of the Water Rail—*Rallus aquaticus* (Pennant)—early in January of this year, with several of the auxilliary feathers white.

I have received information that a specimen of the Little Auk, or Rotche—*Uria minor* (Bresson)—was picked up dead in the parish of Stowe-Nine-Churches, January 29th, 1884.

H. F. TOMALIN.

Northampton, 1884.

THE FLORA OF NORTHAMPTONSHIRE.

(Continued).

BY G. C. DRUCE, F.L.S.

870. *Cuscuta Europaea*, Murr. Great Dodder. Parasitic upon Nettles. Very rare.

Ouse, Cosgrove (Morton); Nene a, near Northampton (Mr. Tebbutt); Nene b, Oxendon (Morton and Martyn), Southwick (Lewin); Nene c, Blatherwycke, King's Cliffe (Rev. S. Palmer in Baxter's British Plants); Peterboro' (Paley), King's Cliffe (Lewin).

The Dodder is an annual plant; the seeds vegetating in the earth, and the young stems climb up the nettles, etc., by means of small tubercles; as soon as they have made a firm hold the earth roots decay, and all nourishment is drawn from their 'host.'

871. *Cuscuta Epithymum*, Murr. Small Dodder. Parasitic on heather, furze, and herbaceous plants. Rare.

Nene a, Harleston Heath (Rev. J. T. Brown); Nene b, Corby (Lewin), Southorpe, Charles' Planting (Jones).

872. *Cuscuta Trifolii*, Bab. Clover Dodder. Parasitic on clover.

Cherwell, about Banbury, common in 1870 (French); Ouse, Yardley Gobion; Nene a, Harleston, near the quarries.

874. *Solanum nigrum*, L. Black Nightshade. Denizen. Cultivated ground. Rare.

First record (Baker's History).

Nene a. Dallington; Nene b, Waste ground, Cliftonville, Abington (Baker); Nene c, Peterboro'; Welland, Stamford Warren (W. H. Jones).

Little better than a casual in Northamptonshire.

875. *Atropa Belladonna*, L. Deadly Nightshade. Native. Woods and road sides, on limestone.

First notice—*Solanum lethale*, Ger., 'nigh Peterboro'' (Morton, 1712).

Nene a, Boughton (Weston); Nene b, Vigo Brickyards, Castle Ashby Churchyard (Rogers)—not wild in Nene a and b; Nene c, Apethorpe (Berkeley), King's Cliffe Woods (Lewin), Wansford (Bodger), Wittering, Old Oundle road, Bedford Purlieus. In greater plenty by road side near Wansford than I ever remember to have seen it elsewhere (W. Pitt, 1797). Welland, Wakeley Wood, Easton (Jones), Marholm (Paley), Fineshade (Lewin).

One of our most poisonous plants, all parts being deadly, and its rich black fruit have probably caused more deaths than any other indigenous plant.

Scott tells of the "Foxglove and Nightshade side by side
Emblems of punishment and pride."

876. *Hyoscyamus niger*, Linn. Henbane. Native. Road sides, quarries. Local and decreasing.

First notice, 1797—W. Pitt, in Agric. report of Northants, on "Rubbish at Blisworth."

Ouse, Cosgrove Quarries, Wicken road sides; Nene a, Courteenhall, Thrupp (Notcutt); Nene b; Yardley Hastings (Rogers), Grendon (Miss Brent), formerly by Midsummer Meadow, Higham Ferrers, Cogenhoe; Nene c, Weldon (Lewin), Peterboro' (Paley), Fotheringhay Castle, Aldwinckle, Oundle and Apethorpe (Berkeley); Welland, Deene, Stamford Warren (Jones).

The Henbane is still much used in medicine for its sedative properties, but in large doses it is undoubtedly poisonous. The plant in a wild state was formerly abundant about Northampton, but now it is rarely found. Mr. Jeyes generally grows it in his garden at Boughton, where it attains a large size.

Dr. Houlton gives an amusing account of a partial poisoning case by this plant, in which the inmates of a monastery by mistake ate the roots for supper. One of the monks got up at midnight and tolled the bell for matins, the rest attended the summons, but some could not read, others fancied the letters were running about like ants, and some read what they did not find in their books.

It was probably the juice of Henbane which Shakespeare describes as—
'With juice of cursed Hebenon in a veal.'

Datura Stramonium, L. Thorn Apple. Rich waste ground. A colonist. First seen—Comp. Cyb. Brit., H. C. Watson.

Grimsbury, a casual (French); waste ground Vigo and Sewage Works, Northampton, generally to be found as a weed in garden ground about Northampton.

It is probable Gerarde introduced this plant into Britain from seed brought by Lord E. Zouch from Constantinople.

Its frequency about Northampton may be owing to its being often bought for smoking in asthmatic cases.

Lycia barbarum, L. Alien. Appears in the vicinity of cottages occasionally, but nowhere wild.

SCROPHULARIACEÆ.

877. *Verbascus Thapsus*, L. Mullein. Native. Road sides, waste

ground, etc. Thinly scattered through the county, but probably in many instances only an escape from cultivation.

First record—Rev. M. J. Berkeley, *Top. Bot.*, 1873.

Ouse, Wicken Wood, Whittlebury Forest, Moorend; Nene a, Harleston, Kilsingbury, Upton, Blisworth; Nene a, Grendon, new soil (Miss Brent), Yardley Hastings (Rogers) probably an escape, Irthlingborough, Mear's Ashby, Houghton, Sewage Works; Nene c, Weldon (Lewin), Southorpe, Charles' Planting (Jones), Barnwell Castle, Bedford Purlieus; Welland, Helpstone (Paley), Fineshade (Lewin), near Stamford.

The Mullein—long valued for its emollient properties—has of late been brought into prominence by the researches of Dr. Quinlan.

880. *Verbascum nigrum*, L. Dark Mullein. Alien. Road sides, quarries. Rare.

First record—Morton, 1712.

Nene a, Harleston (Weston); Nene b, between Woodcock Hall and Loddington (Morton); Nene c, Barnack (Berkeley), Wothorp Grove (Jones), Wansford.

On Barnack quarries, a peculiar monstrosity of this plant was noticed, having three corollas one inside the other, all foliaceous; the anthers were barren and tipped with leaf processes.

881.—*Verbascum Virgatum*, With. Denizen or Alien. Fields and waste places. Rare.

First record—The Author, *Rep. Rec. Club*, 1877.

Harlestone Heath, in a cornfield; on banks by the Sewage Works.

882. *Verbascum Blattaria*, L. Moth Mullein.

Nene a, Harleston (Baker), about Northampton (Rev. W. Wood), near Wansford road side, and naturalized on walls of hospital garden, Peterboro' (Paley).

First record—Baker's History.

884. *Scrophularia Balbisi*, Horn. Water Betony. Wet places, ditches, etc. Common and generally distributed throughout the county.

First record—Notcutt, 1845.

886. *Scrophularia nodosa*, L. Figwort. Native. Damp shady places. Thinly scattered through the county.

First record—Baker's History.

Cherwell, Croughton; Ouse, Whittlewood, etc.; Nene a, Harleston, Brampton (Baker), Salcey, Badby; Nene b, Kettering (Lewin), Easton Wood (Rogers), Delapre; Nene c, Bedford Purlieus; Welland, Wakerley Wood.

889. *Digitalis purpurea*, L. Foxglove. Native. Woods on green sand. Rare and Local. *Cyb. Brit.*, possibly absent in Northants.

First record—Baker's History.

Cherwell, Byfield (Dodd)? Avon, Daventry Wood (Baker's History)? Nene a, Harleston Firs, possibly not wild here; Badby Woods (Baker), wild in this locality; Nene b, Overstone (Miss Birch); Nene c, Oundle.

This conspicuous plant so frequent in many counties is entirely absent on our liassic and oolitic strata.

"The Foxglove now in crimson tresses rich,
Depends, whose freckled bells to insect tribes
Afford a canopy of velvet bliss."—Wordsworth.

And he also minutely describes it—

"When the Foxglove—one by one
Upwards thro' every stage of the tall stem
Had shed beside the public way its bells,
And stood of all dismantled save the last,
Left at the tapering ladder's top, that seemed
To bend, as doth a slender blade of grass
Tipped with a rain drop."

And Coleridge describes how the

"Foxglove tall
Sheds its loose purple bells, or in the gust,
Or when it bends beneath the upspringing lark
Or mountain finch alighting."

Tennyson calls it—

"The Foxglove spire." "And long purples of the dale."

Dr. Withering, author of *British Botany*, first drew attention to its valuable medicinal properties, especially in heart diseases.

890. *Antirrhinum majus*, L. Snapdragon. Denizen. Walls. Rare. Duston, Peterboro' Cathedral and walls thereabout (Paley).

This plant is frequent on old buildings, especially on some of the Oxford Colleges. Cardinal Newman, in his *Apologia pro Vita Sua*, says there was a quantity of Snapdragon on the walls opposite his freshman's rooms, at Trinity, and he looked upon it as an emblem of his own continuance at Oxford.

891. *Antirrhinum Orontium*, L. Com. Snapdragon. Native. Gravelly fields. Rare.

First notice—Morton's History, 1712—*Linaria Antirrhinum dicta*.

Nene c, Thornhaugh (Berkeley); Welland, in the old slate pits, Collyweston (Morton).

892. *Linaria Cymbalaria*, Mill. Ivy-leaved Snapdragon. Denizen. Walls, brickwork of canal sides, etc. Well established.

First record—W. L. Notcutt.

Nene a, Harleston, Dallington, Dodford (Notcutt); Nene b, Mear's Ashby (Lewin), Islip, Irthlingboro', Yardley Hastings (Rogers); Nene c, Peterboro', very common (Paley).

893. *Linaria Elatine*, Mill. Sharp-leaved Toraflox. Native. Cornfields. Chiefly on gravelly soil. Local.

First record—Morton, 1712.

Ouse, Potterspury; Nene a, Dallington (Baker), Moulton Park; Nene b, Castle Ashby (Rogers), Grendon (Miss Brent), near Gib Wood (Lewin), Glapthorn, in a plowed ground below Cransley Wood (Morton); Nene c, Thornhaugh (Berkeley), Peterboro' (Paley).

894. *Linaria spuria*, Mill. Fluellen. Native. Cornfields. On gravelly or calcareous soil.

First record—Morton, 1712.

Ouse, Potterspury, Yardley Gobion; Nene a, Moulton Park, Roade; Nene b, in a plowed ground below Cransley Wood (Morton and Martyn), Weston Favell (Baker), Sywell, Overstone (Lewin), Wollaston (Miss Williams), Castle Ashby, Yardley Hasting (Rogers); Nene c, Thornhaugh (Berkeley), Peterboro' (Paley); Welland, Fineshade (Lewin).

The variety with equal flowers, *Peloria*, was found with the type at Potterspury in 1878.

896. *Linaria repens*, Mill. Creeping Toadflax. Casual.

A plant of this was found by the rail side, near Aynhoe, in 1883. The seeds had probably been carried by passing trains from the rail about Goring, in Oxford, where the seed is native and abundant. Casual plants have also been found by rail side near Banbury.

897. *Linaria vulgaris*, Mill. Toadflax. 'Butter and Eggs.' Native. Sandy fields. Locally common.

First record—Notcutt.

Cherwell, Aynhoe rail banks; Ouse, Cosgrove Quarries, rare in this district; Nene a, Boro' Hill (Notcutt), Kingsthorpe, Moulton Park, Boughton, Brixworth, Brampton, Spratton, Upton, Danes' Camp, Duston Iron Pits, Blisworth; Nene b, Overstone (Miss Birch), Kettering (Lewin), Castle Ashby Sand Pit, one spec. (Rogers), Burton Lattimer, Wellingboro'; Nene c, Peterboro' road side, near Orton (Paley), Wittering, Barnack Castle; Welland, Stamford.

898. *Linaria minor*, Desf. Small Toadflax. Colonist or native. Local cornfields. Very partial to rail banks.

First record—Morton, 1712.

Cherwell, Grimsbury rail (French), Aynhoe railway; Ouse, Furtho Cornfield; Nene a, Moulton Park, Harleston, Kingsthorpe; Nene c, Thornhaugh (Berkeley), Bedford Purlieus (Jones), Peterboro' (Paley), Wittering; Welland, Fineshade (Lewin), Collyweston (Morton), Cornfields back of Walcot Hall (Jones), Burleigh Cornfields.

900. *Limosella aquatica*, L. Native. Muddy margins of pools. Very rare.

First and only record—In Kelmarsh Lane (Morton's History). *Plantaginella palustris*, C. B. Cyb. Brit. ? "If *Littorella* was meant."

Linaria purpurea Mill. Purple Toadflax. Alien. Old walls, etc.

First record—The Author, Duston, 1874.

Yardley Hastings, an escape (Rogers); Peterboro' (Bodger). *L. repens* is probably this plant.

902. *Veronica hederifolia*, L. Ivy-leaved Speedwell. Native. Cultivated fields, hedge banks, etc. Common and generally distributed.

First record—The Author, 1874.

903. *Veronica polita*, Fries. Grey Field Speedwell. Native. Cultivated fields, garden ground, etc. Generally distributed.

First record—H. C. Watson, 1873.

904. *Veronica agrestis*, L. Green Field Speedwell. Native. Generally distributed.

Common with *arvensis*, on the mud-topped walls in many of the villages. First record—Paley, 1860.

905. *Veronica Buxbaumii*, Ten. Colonist. Arable fields and garden ground. Generally distributed and abound out in cultivated ground.

First record—The Author, 1874.

908. *Veronica arvensis*, L. Wall Speedwell. Native. Dry places, walls, way sides, etc. Common and generally distributed.

First record—Notcutt, 1845.

909. *Veronica serpyllifolia*, L. Thyme-leaved Speedwell. Native. Damp fields, road sides, etc. Common and generally distributed.

First record—Notcutt, 1845.

[914. *Veronica hybrida*, L. & *V. spicata*, L. Badby Woods, on the most unreliable authority of Wildgoose, in Baker's History, are almost certainly errors if not impositions. It may be remembered that the same person recorded *Asplenium marinum* as growing in a ditch near Everdon.]

915. *Veronica officinalis*, L. Common Speedwell. Native. Dry heath. Local, yet occurring in a few scattered localities in all the localities save the Avon, in which it may probably yet be found.

First record—Notcutt, 1845.

Cherwell, Croughton; Ouse, Fourslip Copse, Steane; Nene a, Harleston Firs, Kingsthorpe, Badby Wood, Blisworth Spoil Banks, Boro' Hill (Notcutt); Overstone (Miss Birch), Yardley Chase, Easton Wood, Horn Wood (Rogers); Nene c, Kingscliffe (Berkeley), Wansford (Bodger), Peterboro' (Paley); Welland, Wakerley Wood (Jones).

916. *Veronica Chamædrys*, Linn. Germander Speedwell. Native. Hedge banks, woods, etc. Abundant in all the districts.

A great adornment to our way sides, with its bright blue flowers, varying occasionally into light pink or lilac.

First record—Notcutt, 1845.

"Blue eye bright ! Loveliest flower of all that grow
In flower loved England ! Flower whose hedge side gaze
Is like an infant's."—E. Elliott ?

"The little Speedwell's darling blue."—Tennyson.

917. *Veronica montana*, L. Native. Woods.

Holdenby (Baker's History), Bedford Purlieus (Bodger). I have never seen this plant in Northants, and although there is no intrinsic reason why it should not occur, the above records do not certainly prove its occurrence, as Baker's is an old record, and Bedford Purlieus, although a likely locality is recorded by Mr. Bodger, the record was made when that gentleman had only recently begun studying Botany, and it must be verified before we can admit it in our list. It occurs in Bucks, Beds, Oxon, and Leicestershire.

918. *Veronica scutellata*, L. Marsh Speedwell. Native. Boggy places, wet meadows. Local and rare.

For certain record—The Author. See Report of Botanical Record Club, 1877.

Avon, Drayton Reservoir ; Nene a, Harpole, Foxhall, Gayton ; Nene c, Peterboro' (Paley), West Hay, Kingscliffe (Jones), Wittering (Marsh.)

919. *Veronica Anagallis*, L. Water Speedwell. Native. Ponds, ditches, and brooks. Less common than the following species.

First record—Paley, 1860.

Cherwell, Evenley, Banbury (French), Aynhoe ; Avon, Yelvertoft ; Ouse, Furtho, Maidford (Rogers) ; Nene a, Brampton, Foxhall, Wootton, Harpole ; Nene b, Delapre, Castle Ashby, Chadstone (Rogers) ; Nene c, Peterborough (Paley), Weldon ; Welland, Ufford, Barnack, Bainton.

920. *Veronica Beccabunga*, L. Brooklime. Native. Brooks, ditches, ponds. Common in all the districts.

The pink-flowered form, *V. limosa*, has also been noticed.

First record—Notcutt, 1845.

922. *Euphrasia officinalis*, L. Eyebright. Native. Dry heathy ground, road sides, and calcareous pastures. Locally common.

First record—Notcutt, 1845.

Cherwell, Newbottle (French) ; Ouse, dry ridings of Whittlebury Forest ; Nene a, Daventry Reservoir (Notcutt), Badby Wood ; Nene b, Yardley Chase, Hannington, Gib Wood, Yardley Hastings (Rogers) ; Nene c, Wansford (Bodger), Peterboro' (Paley), Charles' Planting, Southorpe (Jones), Southorpe Quarries ; Welland, Wakerley Wood (Jones), Fineshade, Duddington, Collyweston.

The variety *gracilis* is perhaps the more frequent.

This little plant, with its pretty flower, has a classic reputation for eye diseases, but little credence is now given to the almost fabulous tales told of

it by the old simplers ; but to the poets it has always been welcome, and to Milton especially it seemed a favourite—

“Then purged with Euphrasy and rue
His visual orbs, for he had much to see.”

And Shenstone says—

“Yet Euphrasy may not remain unsung
That gives dim eyes to wander leagues around.”

Hood repeats Milton when he says—

“With fairy Euphrasy they purged my eyes
To let me see their cities in the skies.”

And Cowley writes—

“You know Arnoldus, if you’ve read him o’er,
Did sight by me to men stone blind restore ;
Tis true, and they know virtue ought to be
The more esteemed for that stray prodigy.”

922. *Bartsia Odontites*, Huds. Native. Cultivated fields, road sides, etc. ; preferring a clayey soil. Generally distributed.

First record—Notcutt. 1845.

Var. a, *verna*—Yardley, Pattishall, etc. Var. b, *serotina*—The common form.

925. *Pedicularis palustris*, L. Marsh Lousewort. Native. Boggy and marshy ground. Local and rare.

First record—Notcutt, 1845.

Cherwell, Croughton Bog (Beesley) ; Nene a, Daventry Reservoir (Notcutt), Foxhall ; Nene b, Kingscliffe (Lewin), Wittering Marsh.

926. *Pedicularis sylvatica*, L. Lousewort. Native. Heathy places. Local.

First record—Notcutt, 1845.

Avon, Staverton Glen (Notcutt) ; Ouse, Whittlebury Forest ; Nene a, Badby Wood (Notcutt), Harlestone Heath, Kingsthorpe Bushes ; Nene b, Yardley Chase (Miss Brent) ; Nene c, Kingscliffe (Lewin).

927. *Rhinanthus Crista Galli*, L. Rattlegrass. Native meadows, pastures, etc. Common and generally distributed.

First record—W. Pitt, 1797, In meadows below Northampton.

929. *Melampyrum cristatum*, L. Crested Cowhead. Native woods. Local. One of the glories of our flora. Restricted to the eastern portion of the Nene and Welland.

First record—Morton, 1712.

Nene c, Woods at Yarwell and Wood Newton (Morton), South of Braybrooke (Morton) ; Welland, Ufford, Wakerley, Wothorpe Grove (Morton), Fineshade (Lewin), Walton (Berkeley), waste land between the Spinney and the Great Wood, Wakerley (Jones).

930. *Melampyrum pratense*, L. Cow-wheat. Native Woods, on sandy soil. Local.

Almost absent from the Woods of central Northants, not only in those on the lias, but even Harleston Firs.

It occurs sparingly in Plain Woods.

First record—Notcutt, 1845.

Avon, Daventry Wood (Notcutt); this may be in Nene *a* drainage; Ouse, Maidwell and Seywell Woods (Rogers); Nene a, Plain Wood, Badby Wood; Nene b, Castle Ashby (Miss Brent); Nene c, Westwood (Berkeley), Cliff Woods (Lewin), Bedford Purlieus; Welland, Marholm Woods (Paley), Fineshade (Lewin), Wakerley Wood (Jones).

The above seem to be the typical plant.

Orobanchaceæ.

935. *Orobanche major*, L. In Paley's Peterborough List this may be *elatio*r.

938. *Orobanche elatio*r, Sutton. Native. Parasitic on roots of *Scabiosa*. Rare.

First record—Rev. M. J. Berkeley.

Nene c, Old Oundle Road (Rev. P. Banton); Welland, Easton-on-the-Hill (Rev. M. J. Berkeley).

932. *Lathrea squamaria*, L. Tooth Wort. Native. In dense shade—under hazel, etc., and perhaps parasitic.

First record—Rev. M. J. Berkeley.

Nene c, Brigstock Wood (Lewin), Wansford (Berkeley), Westwood, Bedford Purlieus (Berkeley).

942. *Verbena officinalis*, L. Vervain. Native. Local. Dry banks, way sides.

First record—Baker's History of the County.

Nene a, Kingsthorpe, Duston, Norton (Baker), Wootton; Nene b, Brington, Overstone (Baker), Wellingboro'; Nene c, Weldon (Lewin), Bedford Purlieus, Southorpe (Jones), Wittering; Welland, Barnack (Jones), Collyweston, Easton.

This plant—like the Mistletoe—was held in great reverence by the Druids, and beliefs in its powers obtained among the peasantry till recent times—necklaces of Vervain being made for children to be worn as a charm.

Mason describes its use in old Druidic rites—

“Lift your boughs of Vervain blue,
Dipt in cold September dew,
And dash the moisture chaste and clear
O'er the ground and through the air,
Now the place is purged and pure.

Labiatae.

943. *Lycopus Europæus*, L. Gipsywort. Native. Brook and river sides, wet places. Common.

First record—Notcutt, 1845.

Cherwell, Banbury (French), Aynhoe; Avon, Braunston Canal (Notcutt), Yelvertoft; Ouse, Tove Banks, common; Maidwell (Rogers), Canal side from Cosgrove to Stoke Bruerne, common; Nene a, Nene banks Northampton to Brixworth, and Canal to Blisworth, Fawsley, Norton, etc.; Nene b, Nene all along its course, Castle Ashby (Rogers), Boughton Park; Nene c, Nene from Oundle to Peterboro'; Welland, Burghley lake side and sides of Welland from Rockingham eastwards.

944. *Mentha rotundifolia*, L. Round-leaved Mint. Native. Road sides, etc. Rare.

First record—Morton, 1712.

Nene b, Geddington Churchyard (Morton); Welland, Marholme (Bodger), Barnack (Jones), Sibbertoft—In the channel of the rill running down from the first head of the Welland just below Mr. Sandy's house in Sibbertoft (Morton's Hist.)

946. *Mentha sylvestris*, L. Horse Mint. Native or denizen. Rare.

First record—Anderson in New Bot. Guide, 1835.

Nene a, Dodford, not wild, Cotton End (Mr. J. Anderson in New Bot. Guide); Nene c, Peterboro' (Bodger)? Avon, Braunston Canal (Notcutt).

947. *Mentha viridis*, L. Spear Mint. Denizen—wet and waste places. First record—Morton, 1712.

Ouse, Thenford field (Morton). May this not be *sylvestris*? Nene a, Clipston (Morton), Nene bank well established; Nene c, Old Oundle road (Jones).

948. *Mentha Piperita*, Huds. Peppermint. Native. Clayey ditches. Very rare.

First record—The Author. See Report of Bot. Rec. Club, 1878.

Nene a, between Duston and Nobottle.

The Peppermint has long been used in medicine as an antispasmodic and for its carminative properties; a camphor obtained from the essential oil (Menthol) has recently been extensively used for Neuralgia and Toothache.

951. *Mentha hirsuta*, L. Wild Mint. Native. Wet places. Abundant in all the districts.

First record—Notcutt, 1845.

Variety—*Subglabra*.

Cherwell, Aynhoe Canal side; Ouse, Yardley Gobion, Cosgrove; Nene a, very fine near Gayton Canal side; Nene b, Irthlingborough River side; Nene c, Wansford.

White-flowered forms have been noticed. This plant is much frequented by bees and butterflies, the Red Admiral and Peacock being often seen on it. In Brown's pastorals he describes—

“The meadows where

Mint perfumes the gentle air.”

952. *Mentha sativa*, L. Native. Margins of rivers, wet heaths, etc.

First record—The Author, Bot. Rec. Club Report, 1877.

Cherwell, King's Sutton; Ouse, Coppice Moor; Nene a, Harleston, Nene banks, Tiffeld; var. *rivalis* occurs at Gayton, Nene banks near Northampton, Easton Wood (Rogers); var. *paludosa*, Denton, Castle Ashby? (Rogers); *subglabra* (Baker). Yardley Gobion.

953. *Mentha rubra*, Sm. Tall Red Mint. Native. Wet places. Rare.

First record—The Author, 1877.

Nene a, Canal side Northampton to Blisworth.

957. *Mentha arvensis*, L. Corn Mill, Native. Cultivated fields, etc. Common. Occurs in all the districts.

First record—Notcutt, 1845.

Var. *agrestis*, Yardley Gobion, Castle Ashby (Rogers).

958. *Mentha Pulegium*, L. Pennyroyal. Native. Wet places. Rare.

First record—Morton, 1712.

Nene a, Harleston Heath; Welland, Nene b, in watery hollows in the spacious common called Rockingham (Morton). This locality is probably destroyed as the land like so much more in the county has been enclosed.

Like many of the preceding Mints, Pennyroyal has been used for its medicinal properties.

959. *Thymus serpyllum*, Fries. Wild Thyme. Dry banks, pastures, etc.

First record—Morton, 1712. *Serpyllum vulgare hirsutum*, Raii. In dry places, particularly nigh Kingscliffe.

Cherwell, Evenley; Avon, Honey Hill; Ouse, Wappenham (Miss Scott), Cogrove Quarries, Grafton Regis, Roade; Nene a, Harleston Quarries, “Hills and Hollows,” Boro’ Hill, Blisworth; Nene b, Thorpe and Kettering, lemon-scented (Morton), Overstone (Mrs. Birch), etc.; Nene c, Kingscliffe (Morton), Wittering; Welland, Barnack, etc. Sometimes with white flowers.

The Wild Thyme is so well known that only passing reference can be made to its poetic literature.

“With Wild Thyme and the gadding vine o’ergrown” (Milton) can scarcely be written of our plant, but the following undoubtedly refer to it:

“I know a bank whereon the Wild Thyme grows.”—Shakespeare.

“Moory Thyme.”—Campbell. “Pun-provoking Thyme.”—Shenstone.

Its alluring charms to bees is noticed by Spenser, and it early became a symbol of sweetness.

"*Nerine Galatea*, *thymo mihi dulcior Hyblæ*."—*Virgil*."

960. *Thymus Chamædrys*, Fries. Native. Dry hedge banks heaths, etc.

Ouse, Cosgrove, Wicken, etc. ; Nene a, Plain Woods ; Nene c, Wittering Heath, etc.

Much commoner doubtless than these records show.

First record—The Author, Rep. of Bot. Rec. Club, 1877.

961. *Origanum vulgare*, L. Marjoram. Native. Margins of woods, dry banks. Almost absent from central Northants, but abundant in Nene c and Welland.

First record—Morton, 1712. *Origanum vulgare spontaneum*, J. B. "Nigh Finished in great plenty, With variegated leaves in wood nigh Suley."

Nene a, Holdenby ; Nene c, Barnwell Castle, Kingscliffe (Berkeley), Southorpe, Wittering Heath, etc ; Welland, Helpstone Heath (Paley), Fineshade (Morton), Barnack (Jones), Easton-on-the-Hill.

A great favourite of the bees.

MEETINGS OF THE SOCIETY.—NOVEMBER, 1883.

MEETINGS of the Microscopical and other sections were held on the 13th and 27th. Messrs. H. L. Powys Keck and W. Manton Mulliner were elected members. The Photographical section held a meeting on the 6th, when examples of the past season's work were exhibited by several members ; and the Phoenix instantaneous shutter was exhibited, together with specimens of work done by it.

DECEMBER.

A meeting was held on the 11th, being the last meeting held in the old room at the Town Hall.

JANUARY, 1884.

The Museum committee having granted the Society the use of the committee-room adjoining the Natural History Museum in Guildhall Road, we this month moved to our new quarters, and the following meetings were held there :—On the 8th Messrs. W. Tye and E. Tarpley were elected members, and on the 22nd also, Messrs. W. A. Law, G. A. Brown, Walter A. Milne, and F. B. Muscott. Mr. H. Terry presented several volumes of Symonds' Rainfall Tables. Mr. Kempson exhibited various objects.

On the 24th, the Photographic section gave a lantern exhibition at the Grammar School, exhibiting a fine series of transparencies done by their own members—chiefly very picturesque views of local scenery—by Messrs. R. G. Scriven, H. Manfield, F. Wright, C. Law, and G. S. Garrett. Mr. Manfield also showed a large number of the Woodburytype transparencies—the beautiful Niagara series, views of Java and the Javanese, &c.



CASTLE ASHBY CHURCH.

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NORTHAMPTONSHIRE NATURAL HISTORY SOCIETY & FIELD CLUB.

No 18. May, 1884.

A CATALOGUE OF THE GEOLOGICAL COLLECTION IN THE NORTHAMPTON MUSEUM.

PART I.

THE SILURIAN SYSTEM.

IN a series of short papers, of which this is the first one, we propose to give a classified list of all the fossils in the Northampton Museum. The value of such a catalogue will be perfectly evident to the members of the geological section of our society, but we wish to interest others in the museum, and so intend to give, in addition to the bare list of fossils, a short description of some of the more important or characteristic forms, and of the beds from which they come. Also a list of the works in our own or the Town Library, from which further information may be obtained.

The Museum is certainly not what it ought to be in the matter of illustrating the *local geology*; the Middle and Upper Lias being at present very badly represented; by the time, however, that we come to describe these formations we hope to have considerably improved the collection of fossils from them.

The late Mr. Saml. Sharp, F.G.S., F.S.A., gave the nucleus of the present collection, but the great bulk of it was given by the Marquis of Northampton a few years ago. Mr. Robert Etheridge, the eminent palæontologist, said of this magnificent gift—"This collection, almost unrivalled in value and in perfection of specimens, is scarcely equalled in the kingdom.

* * * I must specially notice the Cretaceous series, which is truly valuable and fine, many of the specimens being unique. Also the Solenhofen or Lithographic Slate series, the Oxford Clay Cephalopoda, and the fine series of Devonian Corals, unequalled in any museum. The collection is rendered more valuable to students from the fact that, with few exceptions, they are all British specimens."

Various additions have been made by other gentlemen, and these will be referred to when describing the beds from which the specimens came.

The cases in the museum are arranged so as to give the fossils in stratigraphical order, beginning with the oldest formations; and in the cases the fossils are arranged zoologically, beginning with the lowest forms of life.

The oldest known fossiliferous formation is the Laurentian, and next to that comes the Cambrian, but as neither of these are represented in our museum we commence with the Silurian.

The divisions of the Silurian system originally adopted by Sir Roderick Murchison are as below:—

UPPER SILURIAN ROCKS.

1. LUDLOW FORMATION—
Upper Ludlow beds
Lower Ludlow beds.
2. WENLOCK FORMATION—
Wenlock limestone and shale
Woolhope limestone and shale and Denbighshire grits.
3. LLANDOVERY FORMATION (Passage beds between the Upper and Lower Silurian)—
Upper Llandovery (May Hill beds)
Lower Llandovery.

LOWER SILURIAN ROCKS.

1. BALA AND CARADOC BEDS, including volcanic rocks.
2. LLANDEILO FLAGS.
3. ARENIG AND STIPER-STONES GROUP.

Other classifications, and further sub-divisions, have been adopted by some geologists, and by others the whole of the Lower Silurian rocks are classified as *Upper Cambrian*, thus following Sedgwick. Further information on these points may be obtained from most Manuals of Geology.

The various beds vary considerably in lithological character, and include limestones, different coloured sandstones, shales, and slates, but in most cases they are easily identified as Silurian by the very abundant and characteristic fossils they contain. Corals and Brachiopods are very plentiful, indeed the period has been called the *age of Brachiopods*; some classes of fossils make their first appearance in this formation such as *Land plants*, *Cephalopods*, and *Fishes*; others are found only in this formation, such as the *Graptolites* or *pen stones*. These Graptolites, and a crustacean called a Trilobite, of which there are many species, are perhaps the most peculiar and interesting fossils, and we have selected these of which to give a short description.

The formation is throughout distinctly marine, and Sir R. Murchison gave it its name Silurian because the beds are so well developed, and were first

studied by him in the district of Wales and England, formerly inhabited by a tribe of the Ancient Britons called the Silures.

TRILOBITES. The word Trilobite is derived from two Greek words, *treis*, three, and *lobos*, a lobe. They are an extinct order of the class crustacea, sub-kingdom annulosa. Many of the species of this little animal possessed the power of coiling themselves up into a ball, very similar to the way in which the recent wood louse (locally called a pig) rolls itself up as a means of defence, when anyone would molest it. The body of the Trilobite was protected by an outside shell or crust which covered the whole upper or dorsal side of the body. This crust is made up of three longitudinal lobes, from which characteristic the name Trilobite was applied to it; it is also capable of being divided into three main portions transversely, which parts are often found detached; these divisions are first *the head piece or cephalic shield*, on which were placed the eyes, consisting of a number of facets or lenses, in some instances hundreds in number; second *the body rings*, which varied in number, and had the power of movement upon each other, and third *the pygidium or tail-piece*, which possessed several rings or segments anchylosed* together. A reference to the plate will make these divisions plain.

According to the late Sir Chas. Lyell† Burmeister supposed that they swam at the surface of the water in the open sea, and near coasts, feeding on smaller marine animals, and had the power of rolling themselves into a ball as a defence against injury.

Mr. H. A. Nicholson in the last edition of his excellent Manual of Palæontology, writes as follows :—"They appear to have lived on muddy bottoms, in shallow water, and they probably swam on their backs as do the modern apus and the larvæ of *Limulus*, but although the Trilobites, as before remarked, seem to have delighted in muddy bottoms, they are often found in limestones, and must have frequented particular localities in vast numbers."

The Trilobites first appeared during the Cambrian period, and reached their largest numbers in the Silurian seas; they are less numerous in the Devonian rocks, and make their last appearance amongst the fauna of the carboniferous limestone.

To those of our readers who wish to know more about this extinct form of life, we refer them to a Manual of Palæontology, by H. A. Nicholson, 2nd edit., 1878, from which most of the above information was obtained.

Besides the Trilobites in these Palæozoic rocks another extinct form of

* Joined together by osseous matter so as to form one bone.

† Page 469, The Students' Elements of Geology, by Chas. Lyell.

fossil occurs—the Graptolite. The GRAPTOLITES† appear to have their living analogues in the Pennatulidæ or sea-pens, although some persons think that they ought to be classed with the Polyzoa; they are a sub-class of the Hydrozoa, which latter belong to the sub-kingdom Cœlenterata; they occur generally in a form more or less long, and sometimes curved round. Many of the genera of the Graptolitidæ possessed single or double rows of cellules arranged on what is termed the Solid Axis, each of which cellules bore a Polypite. Figure 1 shows a form which has a single row of cellules, figure 2 presents another form having a double row of cellules upon a central axis, figure 3 is a kind which differs from the other genera, in having the long narrow cellules placed further apart, and it occurs in a coiled form. These Graptolites reached their maximum development in the Upper Cambrian rocks, and disappear altogether at the end of the Silurian period.

Below is a list of works relating to the Silurian system.

Murchison's Siluria, 2 vols.	...	...	Lib. of Nat. His. Soc.
Nicholson, H. A., A Manual of Palæontology, 2nd edit., 1879, 2 vols.	...	...	Town Library.
Nicholson, H. A., The Ancient Life-history of the Earth, 1877	...	...	Town Library.
Bailey, W. H., Figures of Characteristic British Fossils, vol. 1, 1875...	...	...	Lib. of Nat. His. Soc.
Edwards (Milne) and Haime, A Monograph of the British Fossil Corals	...	...	Lib. of Nat. His. Soc.
Davidson, Thos., The Silurian Brachiopoda	...	...	Lib. of Nat. His. Soc.

† Graptolites, from grapho—I write, lithos—a stone, so called because they appear like markings on the stones in which they occur. See specimens in the Museum.

THE FOLLOWING IS A LIST OF THE SILURIAN FOSSILS NOW IN THE CASES AT THE MUSEUM.

LOWER SILURIAN.

Bala and Caradoc Beds	...	...	Car.
Llandeilo Flags	...	...	Ll. Fl.
Arenig and Stiper Stones	...	...	St.

HYDROZOA.

	Formation.	Locality.
Diplograptus folium, <i>His</i>
Various undetermined Graptolites

ACTINOZOA.

*Monticulipora lens, <i>Phil.</i>	...	...	Car.	...	Onny river, Salop.
*Petraia elongata, <i>Phil.</i>	...	...	Car.	...	Salop.

ANNELIDA.

		Formation.	Locality.
		Car. ...	
<i>Tentaculites anglicus, Salt.</i>	Acton Scott, Onny river.

CRUSTACEA.

<i>Asaphus Powisii, Murch</i>	...	...
<i>Calymene</i>...	...	...	Bohemia.
<i>Cheirurus</i>...	...	...
<i>Conocoryphe</i>	...	...
<i>Elisocephalus Hoffii</i>...	...	...	Bohemia.
<i>Harpes</i>...	...	...
<i>Lichas Hibernicus, Portl.</i>	...	Car. ...	Ireland.
<i>Ogygia Buchii</i>...	...	Ll. Fl...	South Wales.
<i>Paradoxides Bohemicus</i>	...	...	Bohemia.
<i>Paradoxides</i>...	...	...
<i>Phacops</i>...	...	...	Bohemia.
* <i>Sphaerexochus</i>...	...	...
<i>Staurocephalus</i>...	...	...
<i>Trinucleus granulatus</i>	...	...	Bohemia.
* <i>Trinucleus concentricus, Eaton</i>...	...	Car. ...	Onny river.
* <i>Beyrichia complicata, Salt.</i>	...	Car. ...	Onny river.

BRACHIOPODA.

* <i>Discina oblongata, Portl.</i>	...	Car. ..	Onny river.
* <i>Leptaena sericea, Sby.</i>	...	Car. ...	Horderley.
* <i>Lingula crumena, Phil.</i>	...	Car. ...	Horderley.
<i>Orthis calligramma, Dalm.</i>	...	Car. ...	Acton Scott.
* <i>Orthis vespertilio, Sby.</i>	...	Car. ...	Hatton Brook.
<i>Orthis radians, Sby. ..</i>	...	Up. Sil. Schist	Russia.
<i>Orthis alternata, Sby.</i>	...	Car. ...	Shropshire.
<i>Strophomena grandia, Sby.</i>	...	Car. ...	Acton Scott.
<i>Strophomena tenuistriata</i>	...	Car. ...	Acton Scott.
<i>Strophomena expansa, Sby.</i>	...	Car. ..	Acton Scott.

CONCHIFERA.

<i>Cardium</i>...	...	...
* <i>Modiolopsis orbicularis, Sby.</i>	...	Car. ...	Onny river.

HETEROPODA.

* <i>Bellerophon acutus, Sby.</i>	...	Car. ...	Hatton Brook.
* <i>Bellerophon bilobatus, Sby.</i>	...	Car. ...	Horderley.

CEPHALOPODA.

* <i>Lituites</i>	Car. ...	Horderley.
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UPPER SILURIAN.

Upper Ludlow Beds	Ll. L.
Aymestry Limestone	Aym.
Lower Ludlow Beds	L. L.
Wenlock Limestone	...	...	W. L.
Wenlock Shale	...	...	W. Sh.
Llandovery Beds	...	...	Llan.

ACTINOZOA.

	Formation.	Locality.
<i>Cyathophyllum truncatum</i> , Linn.	... W. L....	Dudley.
* <i>Favosites fibrosa</i> , Goldf.	... U. L. ...	Near Ludlow.
<i>Favosites cristata</i> , Blum.	... W. L....	Dudley.
<i>Favosites Gothlandica</i> , Linn.	.. W. L....	Dudley.
* <i>Favosites aspera</i> , D'Orb.	... W. L....	Dudley.
<i>Halysites catenularia</i> , Linn.	... W. L....	Dudley.
* <i>Heliolites petalliformis</i> , Lons.	... W. L....	Dudley.
* <i>Heliolites interstinctus</i> , Wahl.	... W. L....	Dudley.
<i>Syringopora serpens</i> , Linn.	... W. L....	Dudley.
* <i>Syringopora bifurcata</i> , Lonsd.	.. W. L....	Dormington Wood
* <i>Palæocyclus porpita</i> , Linn.	... W. L....	Dudley?
* <i>Palæocyclus rugosa</i> , Edwd. & Haime	... W. L....	Dudley.
<i>Thecia Swindernana</i> , Goldf.	... W. L....	Dudley.
* <i>Omphyma turbinatum</i> , Foug.	... W. L....	Dormington Wood.

CRINOIDEA.

* <i>Crotalocrinus rugosus</i> , Miller	... W. L....	Dormington Wood.
<i>Periechoocrinus moniliformis</i> , Mill.	... W. L....	Dudley.
<i>Marsupiocrinus cælatus</i> , Phill.	... W. L....	Dudley.
A <i>Cyathocrinus goniodyctylus</i> , Phill.	... W. L....	Dudley.

ASTERIADÆ.

* <i>Palæocomma Marstoni</i> , Salter	... L. L....	Leintwardine.
* <i>Protaster Miltoni</i> , Salter	... L. L....	Leintwardine.

ANNELIDA.

* <i>Cornulites serpularius</i> , Schl.	... W. L....	Walsall.
* <i>Serpulites longissimus</i> , Murch	.. U. L....	Near Ludlow.
<i>Tentaculites ornatus</i> , Sby.	... W. L....	Dudley.

CRUSTACEA.

<i>Calymene Blumenbachii</i> , Brongn.	... W. L....	Dudley.
<i>Encrinurus punctatus</i> , Brunn.	... W. L....	Dudley.
<i>Phacops caudatus</i> , Brunn.	... W. L....	Dudley.
<i>Phacops</i> sp.	... W. L....	

CRUSTACEA (Continued).

		Formation.	Locality.
* <i>Illæus Barriensis</i> , <i>Murch.</i>	...	W. L....	Colwell cove, near Malvern.
<i>Homolonotus delphinocephalus</i> , <i>Green</i>	...	W. L....	Dudley—a cast.
* <i>Ceratiocaris</i> sp.	...	U. L....	Leamhago.
* <i>Pterygotus bilobus</i> , <i>Salter</i>	...	U. L....	Leamhago.
* <i>Slimonia acuminata</i> , <i>Salter</i>	...	U. L....	Leamhago.

BRACHIOPODA.

<i>Atrypa reticularis</i> , <i>Linn.</i>	...	W. L....	Dudley.
* <i>Atrypa imbricata</i> , <i>Sby.</i>	...	W. L....	Staffordshire.
<i>Discina rugata</i> , <i>J. Sby.</i>	...	U. L....	Near Ludlow.
<i>Chonetes lata</i> , <i>Von. Buch.</i>	...	U. L....	Near Ludlow.
* <i>Lingula Lewisii</i> , <i>Sby.</i>	...	U. L....	Near Ludlow.
* <i>Lingula Symondsii</i> , <i>Salt.</i>	...	W. Sh. .	Buildwas.
<i>Meristella tumida</i> , <i>Dalm.</i>	...	W. L....	Dudley.
* <i>Orthis elegantula</i> , <i>Dalm.</i>	...	W. Sh. .	Buildwas.
* <i>Orthis biloba</i> , <i>Linn.</i> ...	...	W. Sh. .	Buildwas.
* <i>Orthis hybrida</i> , <i>Sby.</i>...	...	W. Sh. .	Buildwas.
* <i>Leptaena segmenta</i> , <i>Angelin</i>	...	W. Sh. .	Buildwas.
<i>Pentamerus Knightii</i> , <i>Sby.</i>	...	Aym. ...	Aymestry.
<i>Pentamerus galeatus</i> , <i>Dalm.</i>	...	W. L....	Dudley.
<i>Pentamerus oblongus</i> , <i>Sby.</i>	...	Llan. ...	Llandovery.
* <i>Obolus Davidsoni</i> , <i>Salt.</i>	...	W. L....	Staffordshire.
<i>Rhynchonella borealis</i> , <i>Schl.</i>	...	W. L....	Dudley.
<i>Rhynchonella diodonta</i>	...	W. L....	Staffordshire.
* <i>Rhynchonella nucula</i> , <i>Sby.</i>	...	U. L....	Near Ludlow.
<i>Rhynchonella Salteri</i> , <i>Dav.</i>	...	W. L....	Staffordshire.
* <i>Rhynchonella Wilsoni</i> , <i>Sby.</i>	...	U. L....	Sedgeley.
* <i>Rhynchonella cuneata</i> , <i>Dalm.</i>	...	W. L....	Dudley.
* <i>Rhynchonella Barrandii</i> , <i>Salt.</i>	...	W. L....	Staffordshire Hay Head.
* <i>Rhynchonella deflexa</i> , <i>Sby.</i>	...	W. L....	
<i>Spirifera elevata</i> , <i>Dalm.</i>	...	W. L....	Dudley.
* <i>Spirifera plicatella</i> , <i>Linn.</i>	...	W. L....	Dudley.
* <i>Spirifera pisum</i> , <i>Sby.</i>	...	W. Sh. .	Hay Head.
* <i>Spirifera crispa</i> , <i>His.</i>...	...	W. L....	Walsall.
<i>Strophomena euglypha</i> , <i>Dalm.</i>	...	W. L....	Dudley.

CONCHIFERA.

* <i>Orthonota amygdalina</i> , <i>Sby.</i>	...	U. L....	Near Ludlow.
<i>Pterinea</i> ...	...	W. L....	Dudley.

GASTEROPODA.

			Formation.	Locality.
* <i>Acroculia prototypa</i> , <i>Phill.</i>	...	...	W. L....	Walsall.
<i>Acroculia Haliotis</i> , <i>Sby.</i>	...	...	W. L....	Dudley.
* <i>Euomphalus discors</i> , <i>Sby.</i>	...	...	W. L....	Dudley.
* <i>Euomphalus rugosus</i> , <i>Sby.</i>	...	...	W. L....	Dormington Wood.
* <i>Euomphalus funatus</i> , <i>Sby.</i>	...	...	W. L....	Dormington Wood.
<i>Euomphalus sculptus</i> , <i>Sby.</i>	...	...	W. L....	Staffordshire.
* <i>Loxonema</i>	...	...	U. L....	Near Ludlow.
* <i>Turbo</i>	...	...	U. L. ..	Near Ludlow.
* <i>Holopella gregarea</i> , <i>Sby.</i>	W. L....	Walsall.

CEPHALOPODA.

* <i>Orthoceras Ludense</i> , <i>Sby.</i>	U. L....	Near Ludlow.
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▲ This is apparently the specimen figured in Murchison's *Siluria*, plate 14, figure 3.

* These fossils have been given by James Carter, Esq., Mr. B. Thompson, Mr. T. J. George, and Mr. W. D. Crick; the rest form part of the collection presented by the Marquis of Northampton, in 1878.

B. THOMPSON,
T. J. GEORGE.

P L A T E .

Fig. 1. *Monograptus sagittarius*, *His.*

Fig. 2. *Diplograptus pristis*, *His.*

Fig. 3. *Rastrites peregrinus*, *Barr.*

Fig. 4. *Phacops caudatus*, *Brünn.* Wenlock Limestone, Dudley Coll.,
Lord Nor.

a. The Cephalic shield or head.

b. The body rings or segments.

c. The Pygidium or tail-piece.

Fig. 5. *Calymene Blumenbachii*, *Brongn.* The profile of a partially coiled specimen from the Wenlock Limestone, Dudley Coll., Lord Nor.

Fig. 6. *Phacops* sp. Part of the head showing compound eye; original specimen in the Northampton Museum. From the Wenlock Limestone of Colwell Copse, near Malvern.

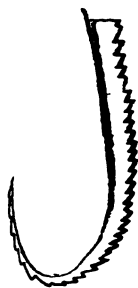


FIG. 1.



FIG. 2.



FIG. 3.

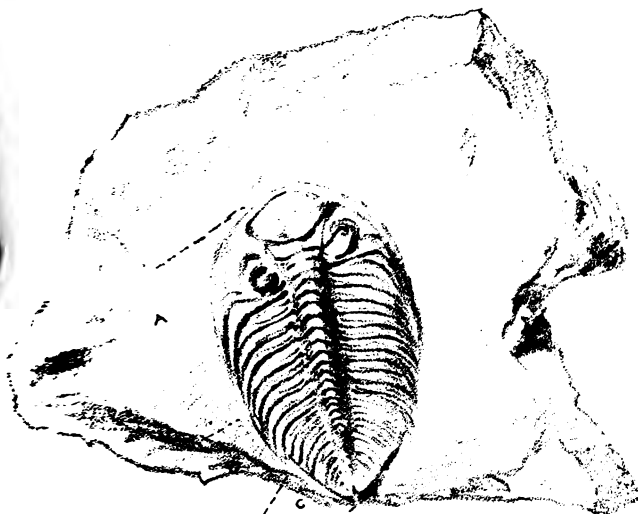


FIG. 4.



FIG. 5.



FIG. 6.

A SYSTEMATIC CLASSIFICATION OF THE LEPIDOPTERA WHICH HAVE OCCURRED IN THE VICINITY OF NORTHAMPTON.

BY WM. HULL AND H. F. TOMALIN.

"N" GROUP.—TINEÆ. a

GENERIC—FAMILY I.—HARPELLA (Hübner.)

Species 1...*Harpella Geoffrella* (Hübner.) *The Geoffreyan*

Locality...Salcey Forest.

GENERIC—FAMILY II.—ÆCOPHORA (Latreille.)

„ 1...*Æcophora Sulphurella* (Fabricius.) *The Yellow Underwing*

Locality...Northampton, Whittlebury Forest.

GENERIC—FAMILY III.—YPONOMEUTA (Fabricius.)

„ 1b...*Yponomeuta Padella* (Fabricius.) *Common Ermine*

GENERIC—FAMILY IV.—ADELA (Latreille.)

„ 1c...*Adela Degerella* (Linnaeus.) *The Degeerian*

Locality...Yardley Chase.

„ 2... „ *Viridella* (Latreille.) *The Green long-horn*

„ 3...*Swammerdamella* „ *The Swammerdamian*

Locality...Nobottle Wood.

GENERIC—FAMILY V.—CEMIOSTOMA (Zeller.)

„ 1...*Cemiosoma Laburnella* (Zeller.) *Laburnum Moth*

Locality...Holdenby, Northampton.

„ 2...*Cemiosoma Scitella* (Zeller.)

Locality...Holdenby.

GENERIC—FAMILY VI.—d NEPTICULA (Stephens.)

„ 1e...*Nepticula Aurella* (Stephens.) *The diamond-barred pigmy*

Locality...Holdenby.

„ 2...*Nepticula Anomalella* (Göetze.)

Locality...Holdenby.

„ 3...*Nepticula Prunetella* (Stainton)

Locality...Holdenby.

a This is the largest group of *Lepidopterus* insects, containing nearly six hundred and fifty species.

b The larvae feed on the wood anemone.

c The larvae of this species are gregarious; the webs which they form may often be seen covering the hedges and other shrubs and trees.

d The family Nepticulidæ contains the smallest *Lepidopterus* insect.

e The larvae of *N. aurella* (Steph.) lives in mines, which it forms in the leaves of the bramble, eating the soft substance between the two layers of the leaf, known as "parenchyma."

GENERIC—FAMILY VII.—ANACAMPIS (Curt.)

Species 1...*Anacampis Juniperella* (Linn.) *The Juniper*

„ 2... „ *Anguli-fasciella* (Curt.)

Locality...Holdenby.

„ 3...*Anacampis Malvella* (Curt.)

Locality...Holdenby.

„ 4...*Anacampis Lutarea* (Curt.) *The clay-coloured*

GENERIC—FAMILY VIII.—LAMPRONIA (Steph.)

„ 1f...*Lampronia Capitella* (Steph.) *The triple-spotted black*

Locality...Northampton.

GENERIC—FAMILY IX.—APHELOSETIA (Steph.)

„ 1...*Aphelosetia marginata* (Steph.) *The bordered straw*

Locality...Holdenby, Yardley Chase.

GENERIC—FAMILY X.—ARGYROSETIA (Steph.)

„ 1...*Argyrosetia Brockella* (Steph.) *Gold I. W.*

Locality...Yardley Chase.

GENERIC—FAMILY XI.—ARGYRONIGES (Curt.)

„ 1...*Argyroniges Spartifoliella* (Curt.) *The Golden Dot*

Locality...Yardley Chase.

„ 2...*Argyroniges Trifasciella* (Curt.) *The tawny treble-bar*

Locality...Holdenby, Northampton.

GENERIC—FAMILY XII.—PTYCHOLOMA (Steph.)

„ 1...*Ptycholoma Lecheana* (Steph.) *The Lechean*

GENERIC—FAMILY XIII.—GLYPHIPTERYX (Hüb.)

„ 1...*Glyphipteryx Equitella* (Scopoli.)

Locality...Holdenby.

„ 2...*Glyphipteryx Thrasonella* (Scopoli.)

Locality...Holdenby.

„ 3...*Glyphipteryx Aurogutella* (Hüb.)

Locality...Holdenby.

„ 4...*Glyphipteryx Quadrisignella* (Hüb.)

Locality...Holdenby.

GENERIC—FAMILY XIV.—CHEIMOPHILA (Hüb.)

„ 1...*Cheimophila Phryganella* (Hüb.) *The drab-clay*

GENERIC—FAMILY XV.—LOPHODERUS (Steph.)

„ 1...*Lophoderus Ministranus* (Steph.) *Yellow-barred iron*

Locality...Wellingborough.

GENERIC—FAMILY XVI.—DEPRESSARIA (Hüb.)

„ 1...*Depressaria Gilvella* (Hüb.) *Brindled-straw*

Locality...Wellingborough.

f The larvae of this insect is one of the burrowers, living in the interior of the tender shoots of the currant.

GENERIC—FAMILY XVII.—GALLERIA (Fabr.)

Species 1g. *Galleria Cereana* (Fabr.) *The Honeycomb*

Locality..Wellingborough.

GENERIC—FAMILY XVIII.—HARPIPTERYX (Hüb.)

„ 1...*Harpiteryx Falcella* (Hüb.) *Dark hook-tip*

Locality..Salcey Forest, Nobottle Wood.

GENERIC—FAMILY XIX.—SCOPARIA (Stainton).

„ 1...*Scoparia Truncicolella* (Stainton.)

„ 2... „ *Scopulatutealis* „

GENERIC—FAMILY XX.—GRACILLARIA (Fabr.)

„ 1a...*Gracillaria Syringella* (Fabr.) *The confluent-barred*

Locality..Holdenby.

„ 2...*Gracillaria Swederella* (Thunb.)

Locality..Holdenby.

GENERIC—FAMILY XXI.—COLEOPHORA (Bouché.)

„ 1...*Coleophora Gryphenella*(Bouché)

Locality..Holdenby.

GENERIC—FAMILY XXII.—ORNIX (Stainton).

„ 1...*Ornix Anglicella* (Stainton.)

Locality..Holdenby.

„ 2...*Ornix Torquilella* (Stainton.)

Locality..Holdenby.

„ 3...*Ornix Guttea* (Haw.) *The white spotted-brown*

Locality..Holdenby.

GENERIC—FAMILY XXIII.—CHELARIA (Haw.)

„ 1...*Chelaria Hübnerella* (Donov.) *The lobster-clawed*

Locality..Salcey Forest.

GENERIC—FAMILY XXIV.—EUDOREA (Curt.)

„ 1...*Eudorea Angustea* (Curt.) *Narrow-winged grey*

Locality..Northampton.

GENERIC—FAMILY XXV.—TINEA (Steph.)

„ 1...*Tinea Scabioscella* (Stephn.) *The scabious long-horn*

Locality..Holdenby.

„ 2t...*Tinea Emberizæpenella* (Stephn.) *Honeysuckle Moth*

GENERIC—FAMILY XXVI.—DIURNEA (Fabr.)

„ 1...*Diurnea Flagella* (Fabr.) *March Dagger*

Locality..Northampton.

g This is a parasitic species; the larvæ are very destructive to bee-hives, devouring the wax and eating through the combs.

h The larvæ of this species are gregarious, and feed on the lilac and privet.

i This species is rare and was obtained by Mr. Jno. Gregory at Holdenby.

"O" GROUP.—PTEROPHORI.

FAMILY I.—PTEROPHORIDÆ.

GENUS I.—PTEROPHORUS (Latr.)

Species 1j..Pterophorus Rhododactylus (Wien Verz.)

Locality..Harlestone.

„ 2^k..*Pterophorus Trigonodactylus* (Haw.)

Locality..Chipping Warden.

„ 3...*Pterophorus Pterodactylus* (Linn.)

Locality..Yardley Chase.

„ 4^l..*Pterophorus Lithodactylus* (Treit.)

Locality..Northampton.

„ 5^m..*Pterophorus Tephradactylus* (Hübner.)

Locality..Yardley Chase, Whittlebury Forest.

„ 6...*Pterophorus Pentadactylus* (Linn.)

„ 7ⁿ..*Pterophorus Galactodactylus* (Hübner.)

Locality..Yardley Chase.

FAMILY II.—ALUCITIDÆ.

GENUS I.—ALUCITA (Linn.)

„ 1...*Alucita Polydactyla* (Hübner.)

j The larvæ feed on the young shoots of the Dog-rose.

k The larvæ feed on the flower-stems of the Coltsfoot in March.

l The larvæ feed on the young shoots of *Inula dysenterica*.

m The larvæ feed upon the Golden-rod from September to May.

n We have found the larvæ feeding on the underside of the leaves of the Burdock in Yardley Chase.

Of six hundred and forty-five British species of Tinesæ, we have recorded in the above list forty-three species.

Of thirty-six British species of Pterophoridæ, we have recorded eight species.

TABLE SHEWING THE GROUPS AND FAMILIES OF
NORTHAMPTONSHIRE LEPIDOPTERA.

SECTION I.—MACRO-LEPIDOPTERA

RHOPALOCERA.

Group "A."—RHOPALOCERA.

Family 1. Papilionidæ

„ 2. Pieridæ

„ 3. Nymphalidæ

„ 4. Satyridæ

„ 5. Erycinidæ

„ 6. Lycaenidæ

„ 7. Hesperiidæ

HETEROCERA.

Group "B."—SPHINGES.

Family 1. Sphingidæ

„ 2. Sesiidæ

„ 3. Zygaenidæ

Group "C."—BOMBYCES.

Family 1. Lithosidæ

„ 2. Arctiidæ

„ 3. Liparidæ

„ 4. Cossidæ

- Family 5. Hepialidæ
 „ 6. Saturnidæ
 „ 7. Lasiocampidæ

Group "D."—CUSPIDATÆ.

- Family 1. Drepanulidæ
 „ 2. Notodontidæ

Group "E."—NOCTUÆ.

SECTION I.—TRIFIDÆ.

Bombyciformes.

- Family 1. Cymatophoridæ
 „ 2. Acronyctidæ
 Genuinæ.
 „ 3. Leucanidæ
 „ 4. Caradrinidæ
 „ 5. Orthosidæ
 „ 6. Cerastidæ
 „ 7. Amphipyridæ
 „ 8. Agrotidæ
 „ 9. Hadenidæ
 „ 10. Xylidæ
 „ 11. Cleophanidæ
 „ 12. Cucullidæ
 „ 13. Anartidæ

SECTION II.—QUADRIFIDÆ.

Variegatæ

- Family 14. Plusidæ
 Limbatæ
 „ 15. Ophinsidæ
 Serpentinæ
 „ 16. Euclididæ
 Minores
 „ 17. Noctuophalænidæ
 „ 18. Clæphoridæ
 „ 19. Nycteolidæ

Group "F."—GEOMETRÆ.

- Family 1. Dendrometridæ
 „ 2. Phytometridæ

SECTION II.—MICRO-LEPIDOPTERA.

Group "G."—DELTOIDES.

Hypenidæ

Generic—Family 1. Hypenidæ

Herminidæ

- „ „ 2. Herminidæ

Group "H."—PYRALIDÆ.

Pulverulentæ

Generic—Family 1. Pyralis

Luridæ

- „ „ 2. Pyrausta
 „ „ 3. Paracolax
 „ „ 4. Hydrocampidæ
 „ „ 5. Botydæ
 Plicatæ
 „ „ 6. Nomophila
 „ „ 7. Eurrhpara

Group "L."—CRAMBITES.

Generic—Family 1. Crambus

Group "M."—TORTRICES.

Generic—Family 1. Tortrix

- „ „ 2. Teras
 „ „ 3. Cnephasia
 „ „ 4. Spilonota
 „ „ 5. Xanthosetia
 „ „ 6. Sericoris
 „ „ 7. Semasia
 „ „ 8. Simathia

Group "N."—TINÆ.

Generic—Family 1. Harpella

- „ „ 2. Ecophora
 „ „ 3. Yponomeuta
 „ „ 4. Adela
 „ „ 5. Cemiostoma
 „ „ 6. Nepticula
 „ „ 7. Anacampis
 „ „ 8. Lampronia
 „ „ 9. Aphelosetia
 „ „ 10. Argyrosetia
 „ „ 11. Argyroniges
 „ „ 12. Ptycholoma
 „ „ 13. Glyphipteryx
 „ „ 14. Cheimophila

Generic—Family 15.	Lophoderus	Generic—Family 19.	Scoparia
„ „ 16.	Depressaria	Group “O.”—PTEROPHOR.	
„ „ 17.	Galleria	Family 1.	Pterophoridae
„ „ 18.	Harpieteryx	„ 2.	Alucitidae

COMPARATIVE TABLE OF EUROPEAN, BRITISH, AND
NORTHAMPTONSHIRE LEPIDOPTERA,
showing the number of species that are included in our classification.

SECTION I.—Macro-Lepidoptera.

	European.	British.	Northamptonshire.
Group 1. Rhopalocera ...	289	66	51
„ 2. Sphingina	132	36	19
„ 3. Bombycina ...	252	79	31
„ 4. Cuspidatina ...	62	33	13
„ 5. Noctuina	875	285	145
„ 6. Geometrina ...	683	274	120

SECTION II.—Micro-Lepidoptera.

Group 1. Deltoidina	} ...	14	2
„ 2. Pyralidina		77	15
„ 3. Crambidina ...		80	9
„ 4. Tortricina	635	301	16
„ 5. Tineina	1728	645	43
„ 6. Pterophorina...	88	36	8
	<u>5,286</u>	<u>1,926</u>	<u>472</u>

The following are species that are not included in our list, and were omitted in error, and should be included in the “B” Group.—Sphinges—

Species 1...	<i>Sesia Ichneumoniformis</i> (Fabr.)	<i>Six belted clearwing</i>
	Locality...Potterspury.	
„ 2...	<i>Sesia Cynipiformis</i> (Esp.)	<i>Gall fly clearwing</i>
	Locality...Furtho.	

The following species have been again recorded, and which we wish to call attention to—

The White W. Hairstreak —*Thecla W-Album* (Knock.)—was obtained at Hopping Hill in the summer of 1883.

The Convolvulus Hawk-moth—*Sphinx Convolvuli* (Linn.)—was obtained at Guilsboro' in the autumn of 1882.

Two male specimens of the Death's-head Hawk-moth—*Acherontia Atropos* (Hübner.)—were obtained in September, 1883, one on the Kingsley Park Estate, and one at Northampton.

The larvæ of the Broad-bordered Bee Hawk-moth—*Hemaris Bombyli-formis* (Dalm.)—was obtained at Yardley Chase in August, 1883.

The Green-brindled Crescent—*Miselia Oxyacanthæ* (Linn.)—was bred from larvæ obtained at Salcey Forest in 1883.

In conclusion, we wish to thank the members of the Entomological Section who have so kindly allowed us to examine their collections and supplied us with valuable information ; and especially are our thanks due to those gentlemen who, without being members of the Society, have lent us their valuable assistance. We trust that any additions to this classification of *Lepidoptera* may be carefully recorded by the Entomological Section, and that at a future time someone will write for our Journal a life history of the *Lepidoptera* of our county, when our works will speak for us, and the labour we have entailed upon ourselves will be rewarded.

Northampton,
April 14th, 1884.

WM. HULL,
H. F. TOMALIN.



METEOROLOGICAL REPORT AND OBSERVATIONS, 1884.

JANUARY.

THE mild weather which marked the early winter months continued during this month, the mean temperature, 43° , being 7° above the average at Greenwich. The rainfall, 1·96in., was 0·08in. above the average of the last 15 years. A violent storm broke over this neighbourhood (as well as other parts of the country) on the 26th, lasting from 2.30 to 6.30 p.m., the wind blowing quite a hurricane; the rainfall was very slight, only 0·39in. being registered for the 24 hours. The barometer fell on that day from 28·95ins., at 9 a.m., to 28·25ins. at 9 p.m. The maximum temperature for the month varied from 35° on the 1st to 54° on the 23rd and 30th. The minimum temperature varied from 32° on the 1st and 28th to 49° on the 23rd. The barometer varied from 30·40ins. on the 16th to 28·20ins. on the 26th.

FEBRUARY.

This month was remarkably dry and warm, only half-an-inch of rain being registered, or 1·44in. below the average of the last 15 years; the greatest fall in 24 hours was only 0·11in. on the 21st. The mean temperature, 41° , was above the average—the maximum being 56° on the 13th, the minimum 26° on the 29th. The barometer varied from 29·10ins. to 30·15ins. during the month.

MARCH.

This month opened very wet for the first ten days, with a slight fall of snow on the 2nd and 3rd; the remainder of the month was exceptionally dry and warm, the mean temperature for the month being 44° ; the maximum varying from 42° on the 1st to 67° on the 17th; the minimum varied from 28° on the 3rd to 48° on the 18th. The rainfall, 1·30in., was rather below the average, the greatest fall in 24 hours being 0·51in. on the 3rd. The barometer ranged from 30·00ins. on the 6th to 28·95ins. on the 10th.

As shewing the mildness of the season Mr. H. N. Dixon records the following dates of the flowering of plants in this neighbourhood, with the average date for six years, compiled from ten stations (all but one south of Northampton), from 1875 to 1880 inclusive.

March	1.	Sallow...	...	...	or 9 days before the average.		
	6.	Herb Robert ...	...	...	60	”	”
	8.	Blackthorn ...	...	...	6	”	”
	9.	Wood Anemone ...	...	...	10	”	”
	15.	Ground Ivy ...	...	...	15	”	”
	16.	Germander Speedwell	...	...	31	”	”
	21.	Cuckoo-flower ...	...	...	22	”	”
	24.	Cowslip ...	...	...	10	”	”

F. LAW.

JANUARY, 1884.

STATION.	OBSERVER.	RAINFALL.					SHADE TEMPERATURE.			
		Total for Month.	Total for Year.	Greatest Fall.	Wet Days.		Maximum.		Minimum.	
							Deg.	Date.	Deg.	Date.
Northampton ..	H. Terry	2.22	2.22	0.45	26	14	50	23	27	26
"	F. Law	1.96	1.96	0.89	26	16	54	23 & 30	23	1 & 28
Castle Ashby ..	R. G. Scriven	3.41	3.41	0.56	26	15	54	23	31	1
Litchborough ..	Ed. Grant	3.10	3.10	0.59	26	17	53	29 & 30	30	1 & 27
Sedgebrooke ..	C. Markham	2.11	2.11	0.37	26	17	56	29	32	1 & 3
Rothwell	J. More, M.D.	1.42	1.42	0.20	26	15	..	..	..	..
Oundle	S. P. Holloway	1.90	1.90	0.36	26	16	..	..	..	..
Towcester	J. Webb	2.86	2.86	0.63	26	19	..	..	..	..
Little Houghton ..	J. Brawn	2.27	2.27	0.31	26	16	50	30	31	1
Fawsley	Lady Knightley	2.03	2.03	0.37	26	18	52	23	29	27 & 28
Thorpe Manville ..	Seth Barnes	2.89	2.89	0.67	26	19	..	..	..	..
Twywell Rectory ..	Rev. H. Waller	2.09	2.02	0.38	26	..	..	..	..	..
Whittlebury	W. S. Miller	2.90	2.90	0.52	26	20	52	29	28	27
Rockingham, Cstl.	H. Wate	2.01	2.01	0.34	26	..	..	..	..	..
Kettering	C. W. Lane	2.22	2.22	0.42	26	17	..	..	..	..
Holdenby	J. Gregory	2.72	2.72	0.58	26	17	..	..	..	..
Peterborough ..	J. Whitwell	1.67	1.67	0.31	26	15	54	23 & 30	30	27
Average 18 years ..		2.04	2.04	..	..	..	..	..	..	..
1866-83	H. Terry	2.04	2.04	..	..	..	..	..	..	..

FEBRUARY.

Northampton ..	H. Terry	0.60	2.82	0.13	21	9	51	13	28	2 & 28
"	F. Law	0.60	2.46	0.11	21	10	56	13	28	28
Castle Ashby ..	R. G. Scriven	0.89	3.30	0.25	21	10	55	13	28	29
Litchborough ..	Ed. Grant	0.76	3.86	0.16	1	13	52	4	24	28
Sedgebrooke ..	C. Markham	0.52	2.63	0.14	1	9	56	13 & 14	27	29
Rothwell	J. More, M.D.	0.45	1.87	0.11	19	8	..	..	..	..
Oundle	S. P. Holloway	0.51	2.41	0.15	1	8	..	..	..	..
Towcester	J. Webb	0.92	3.77	0.22	21	11	..	..	..	..
Little Houghton ..	J. Brawn	0.67	2.94	0.21	21	9	46	9	30	3
Fawsley	Lady Knightley	1.04	3.07	0.16	18	14	52	4 & 13	23	25
Thorpe Manville ..	Seth Barnes	1.02	3.91	0.21	18	13	..	..	..	..
Twywell Rectory ..	Rev. H. Waller .....	..	..	..	..	..	..	..	..	..
Whittlebury	W. S. Miller	1.45	4.25	0.26	15	15	54	13	22	28
Rockingham, Cstl.	H. Wate	0.72	2.73	0.22	1	7	..	..	..	..
Kettering	C. W. Lane	0.60	2.82	0.15	1	7	..	..	..	..
Holdenby	J. Gregory	0.77	3.49	0.19	1	11	..	..	..	..
Peterborough ..	J. Whitwell	0.63	2.80	0.21	21	9	54	13	27	18
Average 18 years ..		1.98	4.00	..	..	..	..	..	..	..
1866-83	H. Terry	1.98	4.00	..	..	..	..	..	..	..

MARCH.

Northampton ..	H. Terry	1.27	4.09	0.48	3	9	61	16 & 17	30	2
"	F. Law	1.30	3.76	0.51	3	9	67	17	28	3
Castle Ashby ..	R. G. Scriven	1.26	4.56	0.57	3	7	68	16	28	1 & 2
Litchborough ..	Ed. Grant	1.87	5.73	0.67	3	12	67	16	28	1
Sedgebrooke ..	C. Markham	1.22	3.95	0.45	3	9	68	16	28	3
Rothwell	J. More, M.D.	1.04	2.91	0.40	3	10	..	..	..	..
Oundle	S. P. Holloway	0.91	3.22	0.39	3	7	..	..	..	..
Towcester	J. Webb	1.73	5.60	0.78	3	7	..	..	..	..
Little Houghton ..	J. Brawn	1.84	4.28	0.55	3	7	52	18	30	1
Fawsley	Lady Knightley	1.41	4.48	0.37	3	10	61	17	30	24
Thorpe Manville ..	Seth Barnes	1.72	5.63	0.68	3	10	..	..	..	..
Twywell Rectory ..	Rev. H. Waller .....	..	..	..	..	..	..	..	..	..
Whittlebury	W. S. Miller	1.50	5.85	0.85	3	7	66	17	25	24
Rockingham, Cstl.	H. Wate	1.40	4.13	0.61	3	7	..	..	..	..
Kettering	C. W. Lane	1.09	3.91	0.42	3	8	67	17	27	1
Holdenby	J. Gregory	1.50	4.99	0.47	3	9	78	16	20	8
Peterborough ..	J. Whitwell	0.89	3.19	0.40	3	7	66	17	28	1
Average 18 years ..		1.79	5.52	..	..	..	..	..	..	..
1866-83	H. Terry	1.79	5.52	..	..	..	..	..	..	..

HENRY TERRY, SURGEON.

THE BOOK OF NATURE.

I.

THE OPENING OF THE BOOK.

A FEW weeks since I was standing in the grand Reference Library at Manchester. There were the long rows—hundreds of rows—of books. The wisdom and wit of the world since the first poet sang, or the historian recorded how men slaughtered each other, or the philosopher speculated as to who and what is man.

There were the volumes from floor to ceiling—but all were closed. There was no voice; yet as I looked I said every book has a voice—every book represents some soul that has gone into the great eternity. The men are gone but the voice is left to us—we have but to open the book and the voice is there.

The next day I was in the silence of the country, far from the noise of commerce or the voice of man, and before me lay the book of nature; but it was a closed book, as were the books in the great library. The cold wind moaned thro' the trees—there was no voice upon the whole landscape—there was no song of the birds, no hum of insects, no flutter of the leaves or rustle of the grasses. The bleak hand of winter had closed the book and it lay at the feet of the student in silence; but it was so different to the books written by men, for this was one of the books of God—ever new, ever marvellous. Since the rolling away of the darkness from the face of the earth, the spring and the summer, the autumn and the winter have never failed. Ever the same to all—for the weary heart of the slave, the oppressed and the ignorant, the flowers have sprung on the way side, the trees have blossomed and the birds have sung, teaching them to believe in the advent of a great new life—that the greed of man can neither control or take away.

We go into the lanes, the fields, and the woods, when the hand of winter is upon the face of the earth, and all is silent. We walk up by the hedgerows and look into the strongly-twisted labyrinth of stem and branch—all are dry and hard, and it seems impossible that ever again those branches can be covered with a mantle of delicate leaves and bunches of gorgeous blossom. The tall grasses withered and broken lie in confusion and ruin. We go into the woods and the wind moans and dashes in fitful gusts among

the bare limbs of the forest trees. The brambles lie bleached and bare, and there is nothing but the wild rustling of the multitude of leaves. The sunny banks in the lanes—that were so covered with flowers, and where the breeze was always laden with perfume and echoing with song—shorn of their beauty lie in the grasp of the ice-king, who has cast his mighty fetters upon the earth.

The student rests awhile counting up the results of his labours ; and the unscientific wanderer in the realm of nature takes to dreaming of all that has delighted him and that yet lives in his soul—so the bleak days and long nights pass in happy memories, until the first soft whisperings of spring are again heard. It may be the quick wild joyous flutter of the blackbird or the thrush as they are startled while building their nest in the thicket ; or, it may be the first buds breaking into leaf in the hedgerow ; or the first crimson-tipped daisy lifting its innocent face from the tuft of grass in which it has been nestling : and so the time for the opening of the book has come, and the student, and the lover, and the children even are all eager to read, as tho' the pages would not tell the same story that has been told for thousands of years.

How capricious is nature. How changeable her moods and fancies— one day promising to unfold the whole fullness and riches of her stores—the whole world breaking into new life ; bright and fairy flowers peeping from every nook and corner ; the birds hurrying to and fro with ceaseless joyous chatter, and gossiping to each other ; troops of May flies are dancing and jiggling about in the broad beams of the warm sun ; and a few stray bees will be tempted to take a ramble thro' the world to note whether the honey-bearing flowers are in bloom. When, suddenly, the bleak east wind will darken the landscape, and the delicate spirit of spring retreats before the cheerless and blighting storm. And so for days and weeks there is no new page to read, but all watch and wait for the return of the soft breath to again cheer the countless living things into the busy whirl of life.

Who has not some favoured spot—some quiet woodland lane with its high banks and tall hedgerows, and moss-covered fences—some bit of wild forest with its thick undergrowth warm and sheltered—or some deep gully, all covered with brambles, on whose banks are hidden a wealth of white and blue violets—from which to watch the progress of the spring—a spot where are to be found the earliest flowers ?

But who can keep pace with the opening of the book ? While watching for the violets on the sunny banks, or noting the growth of the arum as it thrusts its bright handsome leaves from among the crowd of humbler plants that surround it, the woods will be suddenly transformed into a wild and fragrant garden. From beneath the russet carpet of the oak leaves the

gorgeous bunches of primroses appear—the crowds of sweet and gentle anemone, and the wild hyacinth lifts up its beautiful face; and the great buds are ready to burst upon the chesnuts; and the sun as it breaks with ten thousand beams rivals a wealth of glory that surpasses the heart of man to encompass. You rest for a moment, and find that for which you have been watching and waiting in full glory all about you.

You may have been admiring the delicate lace work on the topmost branches of the tall elms—branches that but a few days since were so bleak and bare—now covered by a rich and dainty pattern as tho' from the loom of some skilled workman; or it may be that you were watching the soft green and silky buds that hung in such graceful festoons from the silver lime; or, the soft gossamer-like mantle that had been cast about the tall firtrees; or, you may have been listening to the clatter, noise, and quarrelling of a rookery, where the sleek pompous birds are as uproarious as a crowd of school boys; or, listening as from every thicket there came sweeter and ever more passionate outbursts of song. And so, while waiting, and watching, and listening, the great Book of God has been once more thrown wide open for all the world to read.

The fields, and the woods, and lanes, are full of life—there is no more silence, for there has come again the soft voice that hath soothed so many troubled hearts and filled with joyous laughter so many generations of young souls. It is God's Book of Nature written for all, and can be read by all. Its pages are rich in marvels and full of beauty and song, and a voice of wisdom that is only surpassed by the other great Book of God,—His divine Word to man—and the voice from both books to those who seek the paths of wisdom is—"Come and Read."

W. BARTON,
Preston Deanery.



Northamptonshire Natural History Society and Field Club.

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NOTE.—Where no Town is mentioned Northampton to be understood.
The above List is corrected to April, 1884.

LAWS.

1. NAME.—That the Society shall be named “The Northamptonshire Natural History and Field Club.”

2. OBJECTS OF THE SOCIETY.—The objects of the Society are to encourage a taste for Natural History, and to facilitate its study by meetings for the reading of papers, the exhibition of specimens, the formation of a library and museum, and the record of the Natural History facts of Northamptonshire.

3. CONSTITUTION.—The Society shall consist of honorary, corresponding, life, and ordinary members.

4. HONORARY AND CORRESPONDING MEMBERS. — Individuals distinguished for their researches in Natural Science, for their liberality to this Society, or for other reasons, may, on the recommendation of the Committee, be elected honorary or corresponding members of any general meeting.

5. LIFE MEMBERS.—Any person may become a life member on the payment of Five Guineas, or of books or apparatus of that value. All amounts thus obtained to be set aside for a special fund.

6. ELECTION OF MEMBERS.—New members may be nominated in writing, by a proposer and seconder, at any meeting of the Society, and the names shall be read from the chair—their election shall take place at the next meeting by show of hands, or, if demanded, by ballot.

7. PRIVILEGES AND DUTIES OF MEMBERS.—Every member shall be admitted to all meetings of the Society, and have the use of all books, specimens, and instruments, subject to such conditions as the Committee may determine. He may also introduce two friends to the Society's meetings who shall not, however, take part in the proceedings, except by permission of the chairman.

8. SUBSCRIPTION.—The annual subscription shall be Ten Shillings, due the first day of January in each year, until resignation, or declaration of forfeiture of membership; but the members of the Science Classes may

become annual members on payment of 2/6 per annum so long as they continue to be members of the Science Classes ; but they shall not be entitled to the Journal. The committee shall have power to declare that any member, whose subscription is twelve months in arrear, shall cease to be a member of the Society.

9. MEETINGS AND ORDER OF BUSINESS.—

1. The meetings shall be of two kinds—ordinary and sectional—and there shall be field days in May, June, July, and August if possible.
2. General meetings shall be held on Thursdays, at least once in October, November, December, January, February, and March ; and sectional meetings shall be held on alternate Tuesday evenings throughout the year. The meetings shall be open to all members of the Society. A printed notice of papers to be read at the general meetings shall be sent to every member.
3. The course of business at all general and sectional meetings shall be :—
 1. Confirmation of minutes of previous meeting.
 2. Ballot for members previously proposed.
 3. Proposal of new members.
 4. Miscellaneous business.
 5. Reading of papers.
 6. Exhibition of specimens.

10. FORMATION OF SECTIONS.—Each section shall consist of not less than six members, who shall elect their own officers. A section may be formed upon the written requisition of not less than six members, addressed to the Committee, who shall decide whether it be in the interest of the Society that such section be formed.

11. OFFICERS.—The officers of the Society shall consist of a President, four Vice-Presidents, one or more Secretaries, a Treasurer, and the Presidents and Secretaries of Sections.

12. DUTIES OF PRESIDENT AND VICE-PRESIDENTS.—The President shall be in virtue of his office the Chairman of the General Meetings of the Society and of the Committee. The senior Vice-President present shall take the Chair in the absence of the President.

13. DUTIES OF SECRETARIES.—The Secretaries shall record in the Transaction Book the transactions of the Society at all its meetings, and in the Minute Book the transactions of the Committee ; shall conduct the business of the Society, and prepare an annual report.

14.—**DUTIES OF TREASURER.**—The Treasurer shall receive all sums due to the Society, and make all payments authorised by the Committee. He shall keep an account of all his receipts and payments in the Society's Cash Book, which account shall be balanced annually, examined by two auditors, and presented at the annual meeting. The Treasurer shall also keep a register of the names and addresses of all the members of the Society.

15. **DUTIES OF LIBRARY COMMITTEE.**—They shall have charge of the library and specimens belonging to the Society, in accordance with such bye-laws as the Committee may determine, and shall report at the annual meeting as to the state of the property under their care.

16. **COMMITTEE.**—The management of the affairs of the Society and the administration of its funds shall be vested in a Committee, consisting of seven members of the Society and of the officers, who shall be *ex-officio* members of the Committee. The election shall be conducted as follows :—

Any member may nominate a member to serve on the Committee, in writing, to the Secretaries at least one week before the annual meeting ; and a list of these members, and the members of the retiring Committee, who are eligible for re-election, shall be printed, and a copy given to every member at the annual meeting, who shall mark the names of the seven members for whom he votes. All members of the Committee shall retire from office every year, and those members only shall be eligible for re-election who have attended at least four Committee meetings during their year of office.

The Committee shall meet on the first Tuesday in every month, or at such other times as may be necessary. Five members shall form a quorum.

They shall purchase such books, specimens, &c., as they may think desirable ; examine all accounts and authorise their payment, and conduct the general business of the Society.

The Committee shall have power to fill up any vacancy occurring in their body or in the list of officers.

17. **AUDITORS.**—At the meeting next preceding the annual general meeting two members, not on the Committee, shall be appointed, who shall audit the Treasurer's accounts.

18. **ANNUAL MEETING.**—The annual meeting shall be held in February, when the report of the proceedings of the past year shall be read, the Treasurer's audited accounts be submitted, the Committee and officers for the ensuing year be elected, and other business relating to the interests of the Society be transacted.

19. **MODE OF VOTING.**—All votes shall be taken by show of hands, or, if demanded by ballot, except in cases otherwise specially provided for in these laws.

20. ALTERATION OF LAWS.—No alteration of these laws shall be made except at the annual meeting of the Society; and any proposed alteration must be read from the Chair at the next previous ordinary meeting, and the particulars of such alteration shall be inserted in the notice calling the annual meeting.



LIBRARY BYE-LAWS.

I.—That any member detaining any Book, etc., for a longer period than one month (28 days), be fined One Penny per week until returned.

II.—That any member returning a Book may take it out again if no other member has made an application for it.

III.—That every member shall be responsible for any Book lent to him, and, if lost or damaged, shall make reparation.

IV.—That the Library shall be closed for the fortnight previous to the annual meeting, and that any member keeping a book after the day appointed for the closing the Library, be fined One Shilling.

V.—That no member shall retain any Periodical for a longer period than one week, until two months after the date of publication.

VI.—That certain Books of Reference, to be named by the Committee, shall not be taken away until the close of any meeting, and must be returned ere the opening of the next meeting. Any member infringing this Rule to be fined Threepence each time.

VII.—No Books, Periodicals, etc., may be taken from the Library except under the supervision of the Library Committee; and any member wishing to borrow a Book, etc., must signify his wish to one of the Library Committee at any meeting of the Society, who shall enter the name of the member, particulars of the Book, etc., and date of such loan, in a book kept for the purpose.



CATALOGUE OF BOOKS.

(Corrected to April, 1884.)

*Album of Photographic Views.

- Braithwaite, R. British Moss Flora. 7 parts.
 Caird, J. English Agriculture in 1850 and 1851. 1852.
 Chapuis and Delwaque. Atlas of Plates.
 Damon, R. Handbook to the Geology of Weymouth. 1860.
 „ Supplement to the Handbook to the Geology of Weymouth. 1864.
 Davy, Humphry. Elements of Agricultural Chemistry. 1839.
 *Dresser, H. E. History of the Birds of Europe. 9 vols. 1871-1881.
 Donn, J. Hortus Cantabrigiensis. 1826.
 Francis, G. W. An Analysis of British Ferns and their Allies, 1842.
 *Gould, John. Birds of Great Britain. 5 vols. 1862-1873.
 Gray, R. Birds of the West of Scotland. 1871.
 Griffith & Henfrey. Micrographic Dictionary. 2 vols. 1875.
 Holiday Rambles of a Naturalist.
 Hooker's British Ferns.
 Hughes, W. R. Principles and Management of Marine Aquarium.
 Ibis, The. A Magazine of General Ornithology. 20 vols. 1859, etc.
 James, T. The History and Antiquities of Northamptonshire. 1864.
 Jeffreys. British Conchology. 1862.
 Johnston, J. F. W. Notes on North America. 2 vols. 1851.
 „ „ On Uses of Lime in Agriculture. 1849.
 „ „ Chemistry of Common Life. 2 vols. 1856.
 „ „ Lectures on Agricultural Chemistry. 1844.
 †Jukes, J. Beete. Students' Manual of Geology. 3rd ed. 1872.
 Kirby & Spence. Entomology. 1856.
 Knipe. Geological Map of England. 1880.
 Liebig's Organic Chemistry of Physiology and Pathology. 1st ed. 1842.
 „ Organic Chemistry of Physiology and Pathology. 2nd ed. 1842.
 „ Chemistry, in its application to Agriculture and Physiology. 1847.
 „ Principles of Agricultural Chemistry. 1855.
 †Lowe, E. J. Our Native Ferns. 1865.
 Lubbock, J. Various Papers, etc., bound in 1 vol.
 Lycett, J. The Cotteswold Hills. 1857.
 Lyell, Chas. Elements of Geology. 6th ed. 1865.

- †Mivart, St. Geo. The Common Frog. 1874.
 † „ Lessons from Nature.
 ‡Mott, F. T. Fruits of all Countries, 1883.
 †Molloy, G. Geology and Revelation. 1872.
 *Morton, John. The Natural History of Northamptonshire. 1712.
 The Naturalists' Miscellany or coloured figures of natural objects. 14 vols.
 Northamptonshire Natural History, Journal of the. Vol. 1. 1880-81.
 Nesbit, J. C. On Agricultural Chemistry. 1856.
 Ormerod, E. A. Manual of Injurious Insects. 1881.
 Ralph. Icones Carpologicæ. 1849.
 Reeve. British Land and Fresh Water Mollusks. 1863.
 Reynold. Geological Atlas of Great Britain.
 Sharp, S. Rudiments of Geology. 1st and 2nd editions. 2 vols. 1875-76.
 „ Sketch of the Geology of Northamptonshire. Tract. 1874.
 Simond's Rot in Sheep 1880.
 Slack, H. J. Marvels of Pond Life. 1861.
 *Sowerby's English Botany. 6 vols.
 Symon's Rainfall. 8 vols. 1873-81.
 Taylor, J. Geological Essays. 1864.
 Thompson, T. On Heat. 1840.
 Tull, J. The Horse-Hoeing Husbandry. 1733.
 Warner, R. Plantæ Woodfordensis. 1771.
 Watson, H. C. Geography of British Plants. 1835.
 Whewell, W. Astronomy and Physics considered with reference to Natural
 Theology (Bridgewater Treatise). 1837.
 Woodward, S. P. A Rudimentary Treatise of recent and Fossil Shells.
 1844.

*PALÆONTOGRAPHICAL SOCIETY'S PUBLICATIONS.

- Adam, A. L. Fossil Elephants. 1877, etc.
 Bell, J. Fossil Malacostracous Crustacea. 1857.
 Booney, E. W. Structure of Fossil Plants found in Carboniferous
 Strata. 1868, etc.
 Brady, G. S., Crosskey, H. W., and Robertson, D. Post-tertiary
 Entomostraca of Scotland, etc. 1874.
 Brady, H. B. Carboniferous and Permian Foraminifera. 1876.
 Bush, G. Fossil Polyzoa of the Crag. 1859.
 Darwin, Chas. Fossil Lepadidæ. 1851.
 „ Fossil Balanidæ and Verrucidæ. 1854.
 Davidson, T. Fossil Brachiopoda. 1851, etc.
 Dawkin, W. B., and Sanford, W. A. Pleistocene Mammalia. 1866, etc.
 Duncan, P. M. Fossil Corals. Second Series. 1866-72.
 Edwards, F. E. Eocene Mollusca. 1849-58.

- Edwards, H. Milne, and Haime, J. *Fossil Corals*. 1850-55.
- Forbes, E. *Echinodermata of the British Tertiaries*. 1852.
- Gardner, J. S., and Ettinghausen, C. V. *Eocene Flora*. 1879, etc.
- Jones, T. R. *Entomostraca of the Cretaceous Formation of England*. 1849.
- „ *Tertiary Entomostraca of England*. 1857.
- „ *Fossil Estheriæ*. 1862.
- „ Kirkby, J. W., and Brady, G. S. *Fossil bivalved Entomostraca from the Carboniferous strata*. 1874, etc.
- „ Parker, W. K., and Brady, H. B. *Foraminifera of the Crag*. 1866, etc.
- King, G. *Permian Fossils of England*. 1850.
- Lycett, J. *Fossil Trigonæ*. 1872-79.
- „ *Mollusca from the Stonesfield Slate, Great Oolite, Forest Marble, and Cornbrash. Supplement to Fossils from the Great Oolite*. 1863.
- Miall, L. C. *Sirenoid and Crossopterygian Ganoids*. 1878, etc.
- Morris, J., and Lycett, J. *Mollusca from the Great Oolite*. 1850-55.
- Owen, R. *Fossil Reptilia of the Cretaceous Formations*. 1851-64.
- „ *Fossil Reptilia of the Wealden and Purbeck Formations*. 1853-64.
- „ *Supplements, etc.* 1871, etc.
- „ *Fossil Reptilia from the Kimmeridge Clay*. 1860, etc.
- „ *Fossil Reptilia of the Liassic Formations*. 1861, etc.
- „ *Fossil Cetacea from the Red Crag*. 1870, etc.
- „ *Fossil Mammalia of the Mesozoic Formations*. 1871.
- „ *Fossil Reptilia of the Mesozoic Formations*. 1874, etc.
- „ and Bell, T. *Fossil Reptilia of the London Clay*. 1849-58.
- Phillips, J. *Belemnitidæ*. 1865.
- Powrie, J., and Lankester, E. R. *Fishes of the Old Red Sandstone*. 1868, etc.
- Salter, J. W. *Trilobites*. 1864.
- Sharpe, D. *Fossil Remains of Mollusca found in the Chalk of England*. 1853.
- Traquair, R. H. *Ganoid Fishes of the British Carboniferous Formations*. 1877.
- Wood, S. V. *Crag Mollusca, etc.* 1848-74.
- „ *Eocene Bivalves of England*. 1861, etc.
- Woodward, H. *Fossil Crustacea belonging to the Order Merostomata*. 1866-78.
- Wright, T. *Fossil Echinodermata from the Oolitic Formations*. 1856-80.
- „ *Fossil Echinodermata from the Cretaceous Formations*. 1864-82.
- „ *Lias Ammonites*. 1878, etc.

JOURNALS, TRANSACTIONS, AND REPORTS RECEIVED FROM NATURAL HISTORY SOCIETIES.

Bound Vol. of Natural History Society Reports — Croydon, 1873-78; Geology of Croydon; North Staffordshire, 1877; Bedfordshire, 1875-77; Leeds, 1875-77; Nottinghamshire Naturalists' Society, 1877.

Norfolk and Norwich Naturalists' Society. Vols. 1 and 2. 1869-79.

North Staffordshire Natural History Society. 1 vol. 1870-75.

Essex Field Club. Vols. 1 and 2. 1880-82.

Rugby School Natural History Society. 1 vol. 1878-82.

Also, the following which are not yet bound :—

Bedfordshire Natural History and Field Club. (1 No.) 1877-81.

Birmingham Natural History and Microscopical Society. (4 Nos.) 1869 and 1880-82.

Burton-on-Trent Natural History and Archæological Society. (2 Nos.) 1879-80.

Chester Society of Natural Science. Proceedings. (1 No.) 1878.

 " " " Reports. (4 Nos.) 1879-83

Croydon Microscopical Club. (3 Nos.) 1872. Also 1878-83.

Essex Field Club. (1 No.) 1883.

Manchester Scientific Students' Association. (1 No.) 1878.

Norfolk and Norwich Naturalists' Society. (14 Nos.) 1880 to 1882.

North Staffordshire Naturalists' Field Club and Archæological Society. (3 Nos.) 1881-83.

Nottingham Literary and Philosophical Society. (2 Nos.) 1879-81

Nottingham Naturalists' Society. (1 No.) 1881.

Peterborough Natural History Society. (2 Nos.) 1881-83.

South London Microscopical and Natural History Club. (2 Nos.) Map of District. 1883.

Yorkshire Naturalists' Union Transactions. Parts 1 to 6.

Yorkshire Philosophical Society. Annual Report for 1883.

MAGAZINES AND JOURNALS.

Bound Vols. :—

British Association Reports. 1835-42-43-and-45.

Entomologist. 3 vols. 1878, 1879, and 1881-82.

Geological Magazine. 13 vols. 1866-70 and 1876-83.

Geologist. 1 vol. 1862.

Journal of Society of Arts. 1 vol. 1860.

Journal of Botany. 1876-77-78, and 1881.

Meteorological Magazine—Symond's. 2 vols. 1875-82.

Midland Naturalist. Vol. 1. 1878.

Microscopical Journal. 2 vols.

Nature. Vols. 18, 19, 20.

Popular Science Review. Vols. 11, 13, 14, 15, 17.

Zoologist. Vol. 1. 1877.

Unbound Vols. :—

Entomologist. Monthly.

Zoologist.

Journal of Botany.

The Science. Monthly.

Science Gossip.

Geological Magazine. Monthly.

Midland Naturalist. „

Nature. Weekly.

British Association Reports.

§The Quarterly Journal of Microscopical Science. No. 89. 1883.

PAMPHLETS.

History of Rothwell. P. Cypher. 1869.

‡Local Land and Fresh Water Shells. Dodd & Musson, Nottingham. 1881.

London Catalogue of British Plants. 1871, 1883.

„ „ „ Mosses. 1877.

Meteorology of Croydon. G. Corden. 1878.

Notes on the Flora of Northamptonshire. Druce.

‡On Shepheardella. Liddall. 1880.

‡On the Quartzite Pebbles in the Drift. W. J. Harrison. 1882.

‡On a Deep Boring at Northampton. H. J. Eunson, F.G.S. 1883.

‡On the Permians of the North East of England. E. Wilson, F.G.S. 1876.

Parrots of Victoria. T. A. Forbes, Leith. 1883.

‡Presidential Addresses to the Geological Society of London. B. Etheridge, Esq., F.R.S. 1881 and 1882.

‡Report on the Fisheries of Norfolk. By Frank Buckland, 1875.

‡The Keuper Basement Beds. E. Wilson and J. Shipman. 1879.

A Bound Volume of Papers on Agriculture, by Voelcker and others.

* Books marked with an asterisk are works of Reference only, and are not allowed to be taken from the Library.

+ Lent by the Rev. Canon Scott.

‡ Papers presented by the Authors.

§ Presented by Mr. R. G. Scriven.

REPORT

For the year 1883, read by Mr. S. J. Newman, Hon. Sec., and adopted at the Annual Meeting held at the New Museum, March 27th, 1884.

ONCE more our Society has moved to new quarters, and our thanks are due to the Museum Committee for granting us the use of a room for our meetings and for our library, which indeed fitly finds a home in the same building as the town library, forming as it does a supplementary collection of such books as we can hardly hope the public library to possess, for their funds are apparently not even sufficient to keep up a supply of the more popular class of literature, and therefore there is little hope of their adding books devoted to natural or applied science. True, the Markham Memorial Fund has given a good start in this direction, and has, to some extent, removed the reproach to our town of not having in its public library even the most widely called for recent scientific works. In default of the *town* carrying on the work of providing scientific books for such students and seekers after knowledge who cannot hope to provide themselves with the vast number of books continually being issued—then *our* aim should be to provide for this want as regards natural science.

Again, our town may well be proud of the splendid collection of minerals and fossils which it possesses in the museum—such a collection as is rarely to be found in the provinces. Let us do our duty and try as a Society to strengthen the hands of the museum committee, in their endeavours to make these collections of more practical use and a source of instruction, and thereby profit to our townsmen, instead of its merely existing as a collection for the amusement of the idle and curious. In one way we can perhaps directly assist—a good series of local birds are wanted for the student; the unstuffed skins, of which we possess a fine series given us by Lord Lilford, are perhaps most useful, but for the public museum birds stuffed in natural attitudes would be a more popular form of education; but how much more attractive, and indeed instructive, would it be if each species were shown with its natural surroundings, in such a manner as to exhibit at a glance its whole life-history. This has been successfully carried out elsewhere. But not birds alone, the whole flora and fauna of the district should be worked out and shown in this way in the museum—and not only the flora and fauna of the present day but of the past—and here is work for our geologists.

Turning now to other matters—we have not to record any great increase in our numbers, though we are still growing; many fresh names were added last year, but others dropped out, and death has removed four. We can

hardly expect every year to record such a large increase in numbers as occurred in 1882, when, as may be seen by last year's report, we, in one year, grew from 109 members to about 170—an increase of more than half. This present year 1884, however, bids fair to show another large increase.

Meetings.—The monthly notices of meetings have been regularly issued during the past year, and the notes of observations have apparently been of some use, as Mr. Druce informs me that they have been the means of obtaining for him needed records of plants. The attendance at our sectional meetings has not been large. If the officers of the various sections made it a point to attend and made provision for something of interest to be shown or described at each meeting, we should probably soon find larger numbers attending. To the microscopical section has been largely due the interest of the past year's sectional meetings. The many advantages of having the meetings at regular and stated times renders it advisable to adhere to the fortnightly meetings if possible. The reports of our meetings having been already published in our Journal, it is unnecessary to detail the proceedings of the past year.

A successful soireé was again held in October, fungi being the special feature. Liberal help was given us by many friends and by other societies, and a very fine collection of fungus was brought together.

Our excursions were not very well attended; on the occasion of a proposed visit to the neighbourhood of Olney and Turvey, though a splendid day, only your hon. sec. and one member appeared at the rendezvous. The visits to Althorp House and Castle Ashly proved however more attractive.

Library.—This has been enriched by the purchase of a complete set of the Palæontographical Society's Works, which had long been needed by the geologists. Special subscriptions were raised towards the purchase of this work, and our thanks are due to those gentlemen who assisted by contributions. The full cost however was not raised, and the balance was paid from our general funds. We have to thank Mr. T. J. George for the gift of many useful books, also Mr. H. Terry, and the various societies from whom we have received copies of transactions in exchange for ours; especially may be mentioned the gift from the Yorkshire Naturalists' Union of a set of their transactions.

Journal.—This has appeared with the usual regularity—the past year completing the 2nd volume. Our president's "Notes on Birds," are still appearing, also the Local Flora, by Mr. G. C. Druce, and descriptions of the Geology of the District, by Mr. Beeby Thompson; Messrs. W. Hull and H. F. Tomalin have concluded their list of the Macro-Lepidoptera, and this year are commencing the Micro-Lepidoptera. In the two vols. now complete 16 of the most remarkable trees in the county have been described by Mr. Scriven, and illustrated by photographs by various members. It is

now proposed to commence a series of photographs, under the title of "Picturesque Northamptonshire," which will probably prove an attractive series.

Finance.—By the balance sheet it will be seen that last year resulted in a deficit of £7 ls. Od. ; but we may remind you that we have again had exceptional expenditure in the purchase of the Palæontographical Society's Works, binding up many volumes of magazines which had been left unbound for years past, and the purchase of magazines to complete sets for this purpose. There is every reason to anticipate that the next balance sheet will show a good balance on the other side, when the requirements of our botanical, entomological, and other sections might be met by the purchase of books for their several departments of Natural History.

Though not properly occurring in the report for 1883, the Gilchrist Lectures just concluded may be briefly referred to. Application was made for these last autumn, and was acceded to ; but the trustees could not arrange for them until after Christmas. They have proved very successful. The Mayor and Museum Committee granted us the use of the Town Hall, but this was—as on the former occasion—found too small to accommodate the numbers attending ; therefore it was deemed advisable to have the remaining lectures at the Mission Hall. The later lectures were not quite so crowded as the earlier ones, but it appears evident that if we can arrange for a series ourselves during the next winter, we could probably pay expenses. We might get two or three good lectures from well known men, and for the rest depend upon lectures by local men, well illustrated by lantern views and diagrams. We may have some balance to the good from the receipts of the lectures just finished, which would enable us to start some such scheme next winter.

The annual meeting of the Midland Union, held in 1883 at Tamworth, was attended only by two members of our Society—myself and Mr. Beeby Thompson—whom you had appointed as your delegates. I brought before the meeting there some particulars of the method of working the Yorkshire Naturalists' Union—a union which seems to be doing more as a body than our Midland Union—having several meetings during the year—and publishing very useful "Transactions," being careful lists of the Yorkshire Flora and Fauna, and in many ways apparently of more benefit to the societies connected than our union is to us. The result is that I think every Natural History Society in Yorkshire is enrolled on its list. Whereas the Midland Union appears to be rather losing ground, three more societies last year having dropped out. Perhaps if they attempted to cover less ground it would be possible to have more frequent meetings.

The "Local Scientific Societies" Committee of the British Association met again last year, at Southport, and made some further advance in the

work of bringing into communication all the societies in the county. They have drawn up and issued a careful list of all Scientific and Natural History Societies which publish Transactions. No list of the kind had been obtainable hitherto.

In addition to the Midland Union and Yorkshire Naturalists' Union, there is also the Cumberland Federation; and, within the past few weeks, another strong union has been formed—the “East of Scotland Union of Natural History Societies.” Though not directly relating to us, yet every movement in connection with kindred Societies is of interest to us, and may perhaps be properly referred to in our annual report.

In concluding this, my last report, I may add that I feel obliged, though reluctantly, to resign my position of Hon. Sec., yet in passing on my work to other hands, I am glad to feel that the Society is, in many ways, in a far better and stronger position than ever before, and that there is every prospect that it will long continue a useful and prosperous Society.



THE NORTHAMPTONSHIRE NATURAL HISTORY SOCIETY IN ACCOUNT WITH THEIR TREASURER.

DR.	Receipts.	£ s. d.	£ s. d.	CR.	Payments.	£ s. d.	£ s. d.
By Balance in hand January, 1883	1 16 10	To Journals Account—			
" Subscriptions received—				Printing—Cordeux & Sons	...	47 14 6	
169 at 10/-	...	84 10 0		Ditto—Lithographs, &c., Law.	...	4 3 10	
7 at 5/-	...	1 15 0		Photographs—Woodbury Co.	...	12 17 6	
One 1882 Subscription	...	0 10 0		Printing—Wright, Dain, & Co.	...	2 2 0	
One Life Subscription	...	5 5 0					66 17 10
			92 0 0	Birdsall—Binding	...	...	2 3 1
" Sale of Tickets for Soiree	0 12 0	" Subscription to Midland Union	...	...	2 10 0
" Journals sold	7 19 6	" Ditto to Palaeontographical Society	...	...	1 1 0
" Donations towards purchase of Palaeontographical Society's Works	12 12 0	" Midland Naturalist	...	...	0 6 0
" Balance due to Treasurer	7 1 0	" Allen and Turner—Delivering Journals and Monthly Notices, etc.	...	...	2 12 0
				" Purchase of Palaeontographical Society's Works	...	19 18 0	
				Morton's Natural History of Northamptonshire	...	1 10 0	
				Jeffery's Conchology	...	0 6 0	
				Reed's Mollusca	...	0 5 0	
							21 19 0
				" General Printing—Members' Cards, Monthly Notices, List of Members, Circulars, etc.	...	9 4 0	
				" Expenses of Soiree—Advertising..	£1 16 0		
				Band	...	1 15 0	
				Graphoscopes, Hire of Chairs, Carriage of Fungi, etc.	...	0 14 0	
					...	1 19 10	
				" Purchase of back Numbers of Journal	...	6 4 10	
				" Donation to Museum Attendant	...	0 18 6	
				" Secretarial Expenses, Stationery, Postage, &c.	...	1 0 0	
				" Mark—Magazines, including back numbers.	...	4 14 7	
						2 10 6	
							£122 1 4

I have examined the foregoing Accounts and find them to be correct.

GEO. W. RANDS, Auditor.

PHENOLOGICAL OBSERVATIONS.

Taken by H. N. DIXON and W. LAW, in the neighbourhood of
Northampton, 1884.

OWING to the extreme mildness of the season an unusual number of the hardy plants were in flower all through the winter ; for instance, the Red and White Dead Nettle, Daisy, Groundsell, Corn Marigold, Buttercup (*Ranunculus repens* and *R. acris*), Speedwell (*Veronica agrestis* and *V. hederifolia*), Chickweed, Mouse-ear Chickweed, Dandelion, Wild Camomile, Gorse, etc. ; these are not included in the list given below of the earliest observed dates of flowering.

Cultivated Plants marked with an asterisk *

Jan.	13...	Wild Beaked Parsley.	...	<i>Anthriscus sylvestris</i>
	20...	Lesser Celandine	...	<i>Ranunculus ficaria</i>
		Whitlow Grass	...	<i>Draba verna</i>
Feb.	8..	Wych Elm	...	<i>Ulmus montana</i>
		Common Elm	...	<i>Ulmus suberosa</i>
	13.	Coltsfoot	...	<i>Tusselago farfara</i>
	16...	Violet	...	<i>Viola odorata</i>
	22...	Common Osier	...	<i>Salix viminalis</i>
	23...	Pearl Wort	...	<i>Sagina apetala</i>
March	1...	Sallow	...	<i>Salix caprea</i>
	6...	Herb Robert	...	<i>Geranium Robertianum</i>
	7...	*Plum	...	<i>Prunus domesticus</i>
		Blackthorn	...	<i>Prunus spinosa</i>
	9...	Primrose	...	<i>Primula vulgaris</i>
		Wood Anemone	...	<i>Anemone nemorosa</i>
		Dogs' Mercury	...	<i>Mercurialis perennis</i>
	10...	*Box	...	<i>Buxus sempervirens</i>
	13...	*Almond...	...	
		*Gooseberry	...	<i>Ribes grossularia</i>
		Flowering Currant	...	<i>Ribes sanguineum</i>
		Ground Ivy	...	<i>Nepata glechoma</i>
	16...	Hedge Mustard	...	<i>Sisymbrium officianale</i>
		Germander Speedwell	...	<i>Veronica chamydrys</i>
		Dog Violet	...	<i>Viola canina</i>

March 16...	*Pear	...	...	...	<i>Pyrus communis</i>
20...	Fools' Parsley...	...	...	...	<i>Ethusa cynapium</i>
...	Spurge Laurel	...	...	...	<i>Daphne laureola</i>
21...	Lady's Smock..	...	...	...	<i>Cardamine pratensis</i>
22...	Marsh Marigold	...	...	...	<i>Caltha palustris</i>
...	Wood Crowfoot	...	...	...	<i>Ranunculus auricomus</i>
...	Wood Rush	...	...	...	<i>Lazula campestris</i>
23...	Bulbous Crowfoot	...	...	...	<i>Ranunculus bulbosus</i>
...	Hen-bit...	...	...	...	<i>Lamium amplexicaule</i>
...	Hairy Bitter Cress	...	...	...	<i>Cardamine hirsuta</i>
...	Common Fumatory	...	...	...	<i>Fumaria officinale</i>
24...	Cowslip...	...	...	...	<i>Primula veris</i>
...	Sandwort	...	...	...	<i>Arenaria trinervis</i>
25...	Hemlock Storks' Bill	...	...	...	<i>Erodium cicutarium</i>
29	Black Poplar	...	...	...	<i>Populus nigra</i>
30...	Field Scorpion Grass...	...	...	...	<i>Myosotis arvensis</i>
31...	*Red Currant	...	...	...	<i>Ribes rubrum</i>

H. N. DIXON,

WILBY LAW.



THE FLORA OF NORTHAMPTONSHIRE.

(Continued).

BY G. C. DRUCE, F.L.S.

Solanaceæ.

Solanum Dulcamara, L. Bitter Sweet. Accidentally omitted from its proper place. Native. River sides, hedges, and waste places. Generally distributed.

The white-flowered form at Hardingstone, Rush Mills, Yardley Gobion, etc.

Labiatæ. (Continued.)

962. **Calamintha clinopodium, Spenn. Wild Basil.** Hedge banks, etc. Native. Not uncommon, especially on calcareous soil.

First record—Baker's History, 1822.

Ouse, Maidford (Rogers), Coppice Moor, Potterspury, Grafton Regis, Whittlewood, etc.; Nene a, Boughton and Dallington (Baker), Harlestone, Fawsley, Harpole, Norton road (Notcutt), Gayton, Farthingstone, Tiffeld; Nene b, Yardley Chase (Rogers), Great Billing, Warkton, Wollaston, etc.; Nene c, Peterboro' (Paley), Southorpe (Jones), Wittering, Barnwell; Welland, Collyweston, Deene, Barnack.

963. **Calamintha Acinos, Clairv. Basil Thyme.** Native. Sandy fields and dry calcareous banks. Local and rare.

First record—Baker's History, 1822.

Ouse, Evenley (Beesley); Nene a, Brampton, Dallington Heath (Baker); in sandy fields adjoining Dallington Heath, 1878 (Rev. J. T. Brown); sandy fields, Harlestone (See Rep. of Record Club, 1877); Nene b, Easton (Miss Brent); Nene c, Peterboro' (Paley), Apethorpe and Thornhaugh (Rev. M. J. Berkeley), Helpstone (Bodger), Southorpe Quarries, Sutton; Welland, Stamford Warren (Jones), Fineshade (Lewin), Burleigh.

Gerarde says "it cureth them that are bitten of serpents; being burned or strewed, it drives serpents away; it takes away black and blew spots that come by blows or beatings, making the skin faire and white; but for such things, seuth Galen, it is better to be laid to greene than dry."

965. **Calamintha menthifolia, Host.** Native; hedge banks on gravelly soil. Local.

First record—Baker's History, 1822.

Nene a, Boro' Hill (Notcutt—Thymus Calamintha), Harlestone road between St. James' End and Dallington, Kingsthorpe; Nene b, Abington, Wood Newton (Berkeley), Higham Ferrers; Nene c, Yarwell; Welland, Pilagate (Jones), Barnack.

967. *Melissa officinalis*, L. Sweet Balm.

First record—the Author, 1878.

Naturalized by Brick-yards near Higham Ferrers, Nene b (see Rep. of Record Club, 1878).

The Sweet Balm was formerly highly prized for its medicinal qualities.

“The several chairs of order look you, scour

With juice of Balm and every precious flower.”

Merry Wives of Windsor.—Act 5, Sc. 5.

Its old Greek and Latin names—*Melissa*, *Melissophyllum* and *Apiastrum*—show its high value as a bee plant.

968. *Nepeta Cataria*, L. Cat Mint. Native. Hedges on calcareous soil. Local.

First record—Morton, 1712. *Mentha Cataria*, at Stamford-St.-Martin's.

Cherwell, Huscot, Warkworth (French), Mixbury ? B; Ouse, borders of Whittlebury Forest; Nene a, Kingsthorpe, Dodford; Nene b, Wood Newton (Berkeley), Easton Maudit (Brent), Stanion (Lewin), Kettering; Nene c, Peterboro' (Paley), Wittering (Jones); Welland, Stamford-St.-Martin's (Morton), Footpath from Southorpe to Burleigh, near the Park (Jones).

“Cats,” says Gerarde, “are so fond of the odour that they rub themselves upon it and wallow or tumble in it, and also feed on the branches very greedily.”

969. *Nepeta Glechoma*, Benth. Ground Ivy. Native. Woods, hedge banks, moist shady places. Abundant and generally distributed throughout the county. Although a most variable plant, there does not seem enough permanence in the characteristics of the forms to warrant even varietal distinction.

First record—Notcutt, 1845.

The bitter and aromatic qualities of the Ground Ivy led to its being frequently used as a medicine, being especially valued as an anti-scorbutic.

Ale in which the herb has been steeped is still put on the table at Lincoln College on Holy Thursday, but it is a nauseous compound.

970. *Salvia Verbenaca*, L. Wild Clary. Native. Dry gravelly banks. Local.

First record—*Horminum sylvestre*, Ger. Kingsthorpe Churchyard, abundantly—Morton, 1712.

Cherwell, Charwelton (Baker); Ouse, Brackley College Close (T. Beesley); Nene a, Kingsthorpe *ut supra*, Brampton road, Northampton Castle Moat; Nene b, Midsummer Meadow, Weston Favell, Easton Maudit (Brent); Nene c, Glapthorn, Weldon (Lewin), Oundle (Berkeley), Barnwell; Welland, Collyweston.

Dr. Prior says that “the English name of this plant, Clary, originates

in *sclarea*, a word formed from *clarus*—clear." The seeds if soaked in water for a few moments form a mucilage, which has been used to clear the eye from foreign particles. Mr. W. H. Baxter was the first to point out the cause of this thickening, i.e., the extrusion of spiral cells through the tunic in which they lie coiled up like cushion springs. It makes a very good polariscope object.

(*Salvia pratensis*, L. Kingsthorpe (Baker) is probably a clerical error, *Verbenaca* being intended; only the latter species now occurs there.)

972. *Prunella vulgaris*, L. All heal. Native. Pastures, etc. Common and generally distributed throughout the county.

First record—Notcutt, 1845.

White-flowered forms have been noticed in Wakerley Wood (Jones), Whittlewood.

973. *Scutellaria galericulata*, L. Skull-Cap. Native. River, canal, and brook sides. Generally distributed.

First notice—Notcutt, 1845.

Cherwell, Banbury (French), Thorpe Mandeville (Rogers), Cherwell side, Kingsutton; Avon, Braunston Canal side (Lewin); Ouse, Tove banks, Ouse banks generally, Grand Junction Canal banks generally; Nene a, Nene banks, Canal side; Nene b, Delapre, Nene banks, Kettering (Lewin); Nene c, Nene side, North Dyke side, etc.

976. *Marrubium vulgare*, L. Horehound. Alien, rare. Waste places in or near villages.

First record—Paley, 1860.

Nene a, Gipsy Lane, Kingsthorpe, Brampton, Blisworth, Rothersthorpe (see Rep. of Bot. Rec. Club, 1878)? Nene b, Kettering; Nene c, Fotheringhay Castle side (Berkeley), Old Oundle wood (Jones), Peterboro' (Paley), Southorp; Welland, Pilsgate and Barnack Village (Jones).

The Horehound is well known as an old remedy for pectoral complaints, and various patent medicines have been named after it in order to trade on its reputation; there is great doubt, however, of its entering into any of the preparations so named.

Dioscorides ordered a mixture of the expressed juice and honey. An infusion of an ounce of the herb in a pint of boiling water, allowed to stand for half-an-hour, when taken in doses of half a wine glass full, has been of service in asthmatic coughs.

977. *Ballota nigra*, L. Black Horehound. Native. Way sides and waste places. Common throughout the county.

First record—Notcutt, 1845.

Var. *ruderalis*, Fr. Specimens from Collyweston Quarries were so named by the editor of *Science Gossip*; but although the calyx teeth were more slender than usual, they do not appear to me to be more than an approach to true *ruderalis*.

978. *Stachys Betonica*, Benth. Wood Betony. Native. Woods, etc. Local.

First record—Notcutt, 1845.

Cherwell, Meadow between Overthorp and Astrop (French), near Aynhoe; Ouse, Whittlebury Forest, Grafton Regis; Nene a, Upton, Duston (Baker), Norton road (Notcutt), Badby Woods, Plain Woods; Nene b, Castle Ashby (Rogers), Overstone (Miss Birch), Yardley Chase, Geddington Chase; Nene c, Wansford (Bodger), Peterboro' (Paley); Welland, Wakerley (Jones).

Like so many of the Labrates, the Betony was formerly held in such high repute as to be regarded as a panacea. 'To have as many virtues as Betony' was a proverb denoting merit in the highest degree; and the Italians said "*Vende la tonica et compra la Betonica*"—"Sell your coat and buy betony!" It was also valued for its power against evil spirits, and on this account was frequently planted in churchyards; and hung round the neck as an amulet or charm.

979. *Stachys Germanica*, L. Downy Woundwort. Native?

In some old quarries between Fineshade and Wakerley—Mr. Lewin—from whom I received specimens. The quarries have since been filled up and the station destroyed.

980. *Stachys palustris*, L. March Woundwort. Clown's Woundwort. Native. Ditch sides, wet places, moist thickets.

First record—Notcutt, 1845.

Cherwell, Banbury (French), Aynhoe, Thorpe Mandeville (Rogers), Kingsutton; Ouse, Tove banks, Yardley to Grafton Regis; Nene a, Harpole, Nene side, Gayton; Nene b, Castle Ashby (Rogers), Denford (Lewin), Thorpe Malsor, Cow Meadow, Billing road; Nene c, Peterboro' (Paley), Wansford.

Gerarde records that visiting in Kent he accidentally heard of a countryman who had cut himself badly with a scythe, and had bound a quantity of this herb bruised, with grease, and laid upon as a poultice over the wound, which healed in a week. The old herbalist says, "I saw the wound and offered to heal it for charity, which he refused, saying 'I could not heal it so well as himself,'" a clownish answer, I confess, without any thanks for my good will; whereupon I have named it Clown's Woundwort.

981. *Stachys ambigua*, Linn. Native. Local and rare.

First record—H. C. Watson—Cybele Britannica—1877-1854. Top. Bot. 32, Northton., with mark as having personally seen it.

Ouse, near Helmdon (Rogers); Nene a, Harpole; Nene c, near Peterboro' (H. C. Watson). This was the only part of Northamptonshire visited by Mr. Watson.

Probably a hybrid between *sylvatica* and *palustris*; the Harpole plant was nearer *palustris* than typical *ambigua*.

982. *Stachys sylvatica*, L. Hedge Woundwort. Native. Hedge banks, brook sides, and damp thickets. Common.

First record—Notcutt, 1845.

Cherwell, Banbury (French), Aynhoe; Ouse, Grafton Regis; Nene a, Moulton, Brampton, Spratton, Harleston, Foxhall, Boro' Hill (Notcutt), Courteenhall, Weedon (Norton), Blisworth; Nene b, Delapre, Castle Ashby, etc.; Nene c, Wansford (Bodger), Peterboro' (Paley), Fotheringhay.

983. *Stachys arvensis*, L. Corn Woundwort. Native. Cultivated fields. Local and uncommon.

First record—Morton, 1712. *Sideritis humilis, late obtusifolia*, Ger. In the plowd wood ground betwixt Rowell and Desboro'.

Cherwell, Banbury (Beaaley)—this may be in Oxon; Nene a, Boro' Hill (Notcutt), local; Nene b, Weston Favell (Baker), Mears Ashby (Lewin), between Rothwell and Desborough (Morton); Nene c, Thornhaugh, Apethorpe (Berkeley), Peterboro' (Paley); Welland, Cornfields back of Walcot Hall—1875 (Jones), 1876 (G. C. D.)

984. *Geleopsis Ladanum*, L. Red Hemp Nettle. Native. Dry, sandy, or calcareous soil. Locally frequent.

First record—the Author, 1874—See Rep. of Ex. Club.

Ouse, Potterspury, Grafton Regis; Nene a, Rothersthorpe, Harleston; Nene b, Castle Ashby, Chadstone (Rogers), Grendon (Brent), Kettering (Lewin), Overstone (Miss Birch), Geddington Chase; Nene c, Southorpe; Welland, Cornfield at back of Walcot House (Jones), Collyweston, Burleigh, Barnack—see Rep. of Bot. Rec. Club, 1877.

986.—*Galeopsis Versicolor*, Curtis. Denizen. Cornfields. Local and rare.

First record—Notcutt, 1845. Top. Bot., Kippist spec., 32, Northton.

Nene a, Cornfield by footpath to Flecknoe (Notcutt), Brampton (Rev. G. F. de Tessier), Harleston; Nene b, Great Oakley (Lewin).

987. *Galeopsis Tetrahit*, L. Common Hemp Nettle. Native. Cultivated fields, ditch sides, waste places.

First record—Notcutt, 1845.

Cherwell, Culworth (Rogers); Avon, Barby (Trott); Nene a, Boro' Hill (Notcutt), Badby wood (Notcutt), Harleston, Danes' Camp, Floore, Tiffeld, Rothersthorpe; Nene b, Castle Ashby (Rogers), Grendon (Brent); Nene c, Peterboro' (Paley).

989. *Lamium amplexicaule*, L. Henbit. Native. Cultivated and waste ground on sandy soil, wall tops, etc.

First record—Notcutt, 1845.

Cherwell, Banbury (French), Culworth (Rogers); Nene a, Harleston,

Kingsthorpe, Danes' Camp, Harpole, Gayton, Boro' Hill (Notcutt) ; Nene b, Cogenhoe (Rogers), Higham Ferrers, Mears Ashby, Irthlingboro', Great Houghton, Castle Ashby (Brent) ; Nene c, Peterboro' (Paley), Fotheringhay ; Welland, Barnack.

991. *Lamium incisum*, Willd. Native? Cultivated and waste ground. Rare.

First and only record—Road side near Brigstock (Mr. Lewin) 1860.

Possibly overlooked, but it is certainly absent from the greater portion of the county.

992. *Lamium purpureum*, L. Red Dead Nettle. Native. Cultivated fields and waste places. Abundant and generally distributed.

First record—Notcutt, 1845.

With white flowers near Rockingham, and between Wootton and Hardingstone.

993. *Lamium maculatum*, L. Alien. Road side near Burton Latimer (Lewin), Sibbertoft (Rev. M. J. Berkeley).

994. *Lamium album*, L. White Dead Nettle. Native. Hedge banks, road sides, waste places ; in all the districts, and locally common in some.

First record—Notcutt, 1845.

A great favourite of the bees.

995. *Lamium Galeobdolon*, Crantz. Yellow Archangel. Native. Woods, thickets, old hedge banks. Not common, but widely distributed.

First record—Baker's History, 1822.

Avon, Staverton Wood (Notcutt), Barby (Trott) ; Ouse, Brackley road (Gulliver), Whistley Wood (French), Wappenham Wood (Miss Scott) ; Nene a, Badby Wood (Baker), Berry Wood, Roade, Boughton Green ; Nene b, Horn Wood, Easton Mandit, Yardley Chase (Rogers), Corby (Lewin), Brigstock ; Nene c, Thorpe road (Paley), Bedford Purlieus ; Welland, Blatherwycke (Miss Stafford O'Brien).

996. *Ajuga reptans*, L. Bugle. Native. Moist Woods, etc. Common.

First record—Notcutt, 1845.

Cherwell, Banbury (French), Charwelton, Canon's Ashby ; Avon, Elkington ; Ouse, Wappenham (Miss Scott), Moor End, Whittlebury Forest, and with white flowers ; Nene a, Harlestone, Kingsthorpe, Foxhall, Berry Wood, Badby Wood, Gayton ; Nene b, Yardley Chase (Rogers), Overstone (Mrs. Birch), Delapre ; Nene c, Peterboro' (Paley), Bedford Purlieus, (do. named *A. pyramidalis*? Bodger) Milton Woods ; Welland, Bainton, Rockingham.

(Wildegooose's *A. Alpina*—Badby Wood, Baker's History—was this species).

997. *Ajuga Chamæpitys*, Schreb. Ground Pine. Native. Calcareous field. Rare and perhaps extinct.

First and only record—Morton's History, 1712. *Chamæpitys vulgaris*, Park. In Ufford Fields nigh Helpstone Stone Pits. Same record copied in New Botanists' Guide. Top. Bot., 32, North'ton. ?

1001. *Teucrium Scordium*, L. Water Germander. Native. Fen dyke sides. Most rare if not extinct.

First record—*Scordium*, J. B.—In some ditches on borders of Fens. It gives a garlick-like taste to the milk of cows that feed on it.—Morton's History, 1712; do. in Bot. Guide. Top. Bot., North'ton, 32.

This plant is probably extinct—the drainage of the Fens being the cause of its disappearance—still there is a remote chance of its being found by some of the few ditches below Peterboro'. The plant has a strong alliaceous smell, and is said to impart its flavour to the milk of cows that have fed on it.

1002. *Teucrium Scorodonia*, L. Wood Sage. Native. Dry Woods. Most rare.

First and only record—the Author, 1877. Harleston Firs, near the boundary wall, in small quantity. See Rep. of Rec. Club.

It is in Paley's List of Peterboro' Plants, but the locality, I am informed, is not in this county.

The Wood Sage has been used in Jersey and France as a substitute for hops in flavouring beer, under the name of Ambroise.



MEETINGS OF THE SOCIETY.

FEBRUARY.

5th—Messrs. W. Terry and H. P. Chandler were elected members.

MARCH.

4th—Mr. P. H. Page was elected a member.

18th—Messrs. F. Hill and C. B. Smith were elected members. Specimens of Micro-fungi were exhibited by Messrs. Dixon and Osborne.

27th—The annual meeting. The report was read by Mr. S. J. Newman (see page 72). The officers of the Society were then elected. Mr. Newman resigned the secretaryship, and Mr. T. J. George was elected in his place. Messrs. H. E. Randall, Thos. Osborne, Frank Clarke, and T. T. Hall were elected members.

APRIL.

8th—Messrs. E. G. Loder and H. Greenough were elected members. A specimen of the volcanic rock, found at the deep boring at Orton, near Kettering, was exhibited by Mr. H. J. Eunson. Prof. Bonney, who had examined this rock, reported it to be "a rhyolitic tuff, or a true rhyolite much crushed, and similar to rocks in the volcanic group of Charnwood Forest."

22nd—A general meeting of the Microscopic Section, the subject being "Pond Life,"—23 members and 12 visitors being present. Mr. J. Gregory gave a description of the minute forms of Pond Life, his remarks being illustrated by a fine series of drawings. Living specimens were exhibited under the microscope by Messrs. Kempson, Durham, Gregory, R. Phipps, and H. J. Eunson. Mrs. A. Pell, Miss Griffin, Messrs. J. H. Marshall, Sherwell, and Dyer were elected members.

1. The first part of the document is a list of names and addresses of the members of the committee.

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QUEEN ELEANOR'S CROSS. NORTHAMPTON

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NORTHAMPTONSHIRE
NATURAL HISTORY SOCIETY & FIELD CLUB.

No 19. August, 1884.

ABNORMAL REPRODUCTION IN MOSSES.

A PAPER READ BEFORE THE SOCIETY, MAY 6TH, 1884, BY
H. N. DIXON, M.A.

(AFTER describing the normal method of reproduction in mosses) * * * * *

This then is a brief account of the life-history of a moss, the cycle being completed by the production of a spore by means of fertilization, accomplished by the contact of two organs of different sexes, from which spore a much branched, green filament, called the *protonema*, is produced, on which buds are formed that develop by ordinary growth into perfect plants.

Now it is a surprising fact to one commencing the study of mosses, that in a very large number of species this mode of reproduction never takes place ;—I am referring now to British mosses ; probably most of these species may be found in perfect fruit elsewhere, while on the other hand some of those which mature fruit here are only found in the barren state in other countries ;—and moreover that of the rest there is a still larger number which, though they have been found in perfect fruit in this country, yet only very rarely produce it. There are at least some thirty species which in this country are only found in the barren state, and perhaps fifty more which, though common or fairly well distributed, are very rare in fruit. This makes a total of at least 80, a large proportion of the whole number of British species, which amounts to about 560. Among the higher plants it is a very rare thing for a species not to be in the habit of producing flowers, and this, with indigenous plants, is almost synonymous with forming fruit. The duckweeds are an example of the contrary, which in this country is almost confined to aquatic plants.

How then are these mosses perpetuated ? The commonest way, as I have mentioned above, is by simple branching and new growth from the roots, which of course tends rather to the perpetuation of the individual than to reproduction and dissemination.

But in many mosses it is effected otherwise, and by very varied contrivances. In some the asexual method is subsidiary to the normal, while in others it appears to have almost supplanted it. For the sake of convenience I will use the term vegetative to embrace all these asexual methods. In considering the various contrivances for ensuring vegetative reproduction it will be well to classify them in two divisions:—(I) when reproduction is caused by special growth of the ordinary organs; (II) when special structures are formed for the purpose. The two run closely into one another, and I shall not confine myself strictly to their limits, an abnormal growth of the leaves, which I shall mention below, belonging of course to the first class, but more conveniently taken with the second—that of the specialized structures.

I shall pass over the first group rapidly, as they are of less importance. In the first place there is the growth of new buds from the root-hairs. These root-hairs are very fine threads, usually of a red or brown colour, springing not only from the base of the plant, but frequently, as in *Bryum*, *Dicranum*, and many other genera, from some distance up the stem. In some Hypna, as in *Hypnum filicinum*, a not unfrequent moss in bogs and by the side of streams, they form a thick brown matting over the whole length of the stem. Buds are produced from these root-hairs in two ways: by immediate formation, just as the normal buds of the moss plant are formed on the brown primary branches of the protonema, or by growth of the root-hairs by elongation and branching into a pseudo-protonema of green chlorophyll-containing threads, from which secondary branches the buds arise which grow into new plants. These of course will frequently become severed from the parent plant.

Professor Sachs in his Text Book of Botany (*Eng. Transl.*, 2nd ed., p. 368) mentions “the remarkable fact cited by Schimper, that in *Dicranum undulatum* annual male plants are formed in this manner on the tufts of perennial female plants, and fertilize the latter.” Now this statement, when put in this form, certainly strikes one as remarkable, but a little difference of words will go a long way; and, as stated by Dr. Braithwaite in his British Moss Flora, it does not strike us as so curious; for instance in his description of *Fissidens exilis*, a rather rare plant, the smallest British species of a genus of beautiful mosses, four or five species of which, including the one I am now speaking of, are to be found in this neighbourhood, he says, “Male flowers produced on the root-hairs of the female plant.” That is to say it is simply a dioecious or pseudo-monoecious moss, the two kinds of organs growing on two plants or two different parts of the same plant connected by root-hairs. This is surely bringing it down to the level of common life! And indeed with a closely allied if not the same species that Schimper is speaking of, all that Dr. Braithwaite says of it is “Male

inflorescence gemmaceous, nestling in the tomentum," that is in the downy mass of root-hairs which clothe the stem. Even in some cases where aerial root-hairs are not formed on the stem, as in *Ceratodon purpureus*, some of the *Dicranellas* and *Pleuridium*, the same green pseudo-protonema filaments are formed occasionally in tufts in the axils of the leaves, which doubtless behave in the same manner as those derived from the ordinary root-hairs.

Another method is that in which special branchlets called flagellae are formed, usually with very minute leaves, as in *Didymodon flexifolius*, some of the *Dicranums*, &c. ; these are easily detached from the parent plant, and by throwing out rootlets fix themselves to the ground and give rise to new plants.

We now come to the second class, in which special organisms are developed to ensure reproduction. First of all we have a connecting link between this and the last group, in the cases where the leaves by separation from the plant, or by abnormal growth of the leaf cells, give rise to new plants. A typical example may be given in *Campylopus pyriformis*, which I have found in abundance on heaths and sandy turf in the neighbourhood of this town. If a patch of this moss be examined, a great many leaves will be observed to be broken off and lying on the top, and if the hand be passed over it, many more will be readily detached. Now each of these leaves is capable of throwing out filaments by growth of the basal cells, when placed under favourable conditions, and these filaments form a protonema from which buds arise in the ordinary way, giving rise to new plants. This may be compared with the cases among flowering plants of propagation by means of single leaves ; this is the case for instance with *Cardamine pratensis*, while the *Begonias* are frequently perpetuated by horticulturists in this manner. In *Leucobryum glaucum* it is the cells at the apex of the leaf which give rise to the protonema.

Now these modes of reproduction are regular, and so to say characteristic of the species, but the same or a closely allied method takes place sporadically, in other mosses, when placed in abnormal conditions. In certain cases the cells of the leaf may be found to have grown out into colourless or brown filaments, which will, if allowed, grow into the ordinary green conferva-like filament of the protonema. I believe this growth is induced, at least in many cases, by the plant having sufficient moisture to promote vegetation, while growth in the ordinary directions is prevented by peculiar circumstances, as when it has been gathered and kept in the damp for some time on paper, or some other substance, which does not allow of its receiving nourishment through the ordinary channels. I have noticed it in *Funaria hygrometrica* and *Schistidium apocarpum* ; and I have lately found the marginal cells of *Entosthodon fasciculare* growing out in the same way ; this was under ordinary conditions. In *Andreaea Rothii*, an alpine moss,

with specimens brought from the west of Scotland and kept under the conditions described above, I have lately observed a similar growth. After being kept for some months it was seen to be covered with a brown filamentous structure, of much the same reddish-brown colour as the leaves, very much branched, and much more resembling some of the marine algae than the protonema of a moss. However, its development could be distinctly traced from a short protuberance of the leaf-cells, otherwise it might be thought to be one of the parasitic algae which are frequent on mosses, especially on the members of this genus. In other cases the filaments appeared to have arisen from the axils of the leaves, and in others again the upper narrower part of the leaf had become much elongated, and had then branched and rebranched like the rest. The older branches were opaque, the younger more transparent and distinctly jointed, and closely resembling the same structures in *Schistidium apocarpum* mentioned above.

A similar growth to the above, which however I have not seen, is said to take place from those cells of the spore-sac, within the sporangium, which have not developed into spores; these have been observed to grow into a pseudo-protonema in the same way as the cells of the leaves in the manner above described.

Before passing on to the next class of structures, which are alike the most interesting and the most important, there is one kind that should be mentioned, where bulbils, transformed from buds, are formed in the axils of the leaves, and are easily detached, when they develop leaves and so produce new plants. The typical example of this, and the only one that I am acquainted with among British mosses, is *Webera annotina*. When the moss is living these bulbils form a most conspicuous part of the plant. There is a striking analogy between these and the bulbils formed in the axils of the leaves of *Lilium bulbiferum*, and other lilies, by which the plants are propagated, and also those which occur among the flowers of various species of garlic; and we may also compare the bulbils formed on the fronds of certain ferns.

Lastly, we have the formation in various mosses of special organisms called *gemmae*. In some cases they are characteristic of the species, in others they occur only sporadically. The simplest form is in such mosses as *Zygodon viridissimus*, where the nerve of the leaf gives rise on its upper surface to cylindrical dark green knobs, consisting of usually from four to six segments, with sometimes at least a median division running through the whole or part of the length, so as to form two rows of segments side by side. I believe the *gemmae* of this species are not mentioned in any of our moss-floras, but they are exceedingly abundant on the plant about here and elsewhere where I have found it, and, Mr. Bagnall tells me, in Warwickshire. The upper, free end of the *gemma* is narrowed, sometimes to a slight

point. The divisions of the segments and the external walls are frequently brown. Growth, which takes place either on the parent plant or after detachment, and which may be watched with the microscope by placing in a drop of water and keeping for a few days, takes place at either or both ends; in this species I have never seen it commence with any of the intermediate segments. It begins by a protuberance of the wall of the segment, which grows out into a filament of about the same diameter as the gemma, which meanwhile usually elongates to some extent. A septum or division is generally formed across the filament at the point where it arises from the gemma. The filament grows, divides into segments, branches, and becomes filled with chlorophyll in the same manner precisely as the filament of the protonema arising from the spore of the perfect fruit. From this spring buds in the same way as from the true protonema.

In *Orthotrichum Lyellii*, nearly allied to the last, which may be found sparingly on the trunks of trees, always in a barren state, the gemmae arise not only from the nerve, but from the margin of the leaf, as well as from the upper and under surfaces. When young they are brown, but they soon develop chlorophyll grains, though the walls and septa usually retain the former colour. They are more obtuse than those of *Zogodon viridissimus*, and frequently become branched.

This form of gemma is found in other species of the same genus, and gave rise some time ago to one of those errors of classification which a century or two back were so common, and which, though in this case certainly pardonable from the minute character of the differences of structure, remind us of such tales as that of the bernicle goose, which travellers have assured us they have seen drop out of the shell of an ordinary barnacle growing on a tree, fall into the sea and swim away! There is perhaps not much difference to the popular ear, but to a cryptogamic botanist the fact that the outgrowths of the leaves of a moss should have been supposed to be one of the algae, that half-a-dozen cells, so to speak, of *Orthotrichum Lyellii* should have been honoured with the name of *Conferva muscicola*, and removed to a totally different division of the vegetable kingdom, is almost as ludicrous a fallacy as the belief prevalent less than two centuries ago, that crystal was merely a form of compressed ice, or that the root of the mandrake only grew under the gallows, and when uprooted was in the habit of uttering a shriek!

And yet the differences of structure here are exceedingly minute; and if the origin of the filaments arising from the gemmae were not known, it would be a very difficult thing to distinguish them from some of our branched filamentous algae. In the first stage, before the growth of the filament, the median division of the gemma distinguishes it from the confervae, which invariably, I believe, consist of a *single* row of cells placed end to end. But

in the later stage it is difficult, if not impossible, to give any definition which will serve to distinguish it clearly from some of the branched algae; but I believe in the latter case the branching is almost always of a somewhat symmetrical and regular nature, and the angles of divergence of the branches from the main stem are mostly uniform in each species, while in the moss filaments the ramification, as well as the angle of divergence, is altogether irregular.

In *Ulota phyllantha*, of which the specimens that I have here were brought from the west of Scotland, the gemmae are produced in thick tufts at the apex of the leaves, radiating from the thickened excurrent nerve. Occasionally they appear on other parts of the leaf. They are narrower than those hitherto mentioned, in proportion to their length, and not unfrequently have a jointed appearance, as if one gemma had grown upon the top of another.

In *Tortula papillosa* the gemmae lie in thick yellowish masses along the upper side of the thickened nerve, and form a very conspicuous feature of the plant. They are almost globular, and are composed of a number of segments, each of which, or at least of the external ones, may produce a filament and grow into a pseudo-protonema.

In *Didymodon flexifolius*, which I have not found in this county, the gemmae are less frequent; they are however so far characteristic that they form a distinct variety of the species, one form producing fruit, and without gemmae, the other gemmiparous, and I believe not forming fruit. I have observed them also rarely on other species of *Didymodon*; and also occasionally on *Ceratodon purpureus*, one of our commonest mosses; they have there more the appearance of those of *Zygodon*.

The gemmiform bodies of *Pottia cavifolia* are very curious, and very different from those hitherto described in their development. It is a rather common moss, growing abundantly on the mud tops of our stone walls. If a leaf be placed under the microscope there will be seen adherent to the upper surface one or two little bag-like structures, containing a granular substance which consists of the gemmae from which the protonema is formed. There is an approach here to a special organization for the development and protection of gemmae, and this is still farther shown in the next species which we have to notice, viz.:—*Aulacomnion androgynum*, one of the best known of our gemmiparous mosses. Looked at carelessly it does not appear to differ very greatly from some of our mosses which have minute sporangia on moderately long fruit-stalks; but on a closer examination it is seen that the exceedingly small globular heads are in reality masses of minute gemmae, radiating in all directions from the apex of the stem, to which they are attached by very fine thread-like stalks; and that moreover the stem on which they grow is not a fruit-stalk like that of the sporangium,

but merely a prolongation of the main stem of the plant, with no traces, or very minute ones, of leaves. These gemmae are smaller than those of the *Orthotrichei*, narrowed at both ends, and usually composed of about six cells, one apical and one basal, the other four in two pairs between them. Growth apparently takes place from any of the segments, but usually I have seen it commence from one of the middle ones. The filament arising from this growth is much narrower than that of the *Orthotrichei*. The other British species of the genus, *Aulacomnion palustre*, a common moss in bogs, also, though less regularly produces gemmae in a similar manner.

The last example which I shall mention is a moss which I have not found in this county, and of which, unfortunately, I have here no specimens, viz. :—*Tetraphis pellucida*. Here the gemmae are placed, as in the last, on an elongated stalk, but in addition there is a ring of modified leaves surrounding them, and forming a very graceful cup. The gemmae are placed on long, very thin footstalks, and as the younger ones grow up they force the older ones off their stalks, and they then fall on the ground, or are carried away by the wind or other means. They are composed of a considerable number of segments, arranged in the form of a disk, with the central part thickened, so that the margin consists of one thickness of cells, the central part of several thicknesses. This confirms what we noticed in *Zygodon*, that each segment of the gemma is not intended to throw out a protonemoid thread, but probably those which remain undeveloped serve as a storehouse of nourishment for the protonema in its primary stages. For it would be obviously impossible for the segments in the interior of the gemma of this moss to throw out filaments, surrounded as they are entirely by the rest.

I have now described the most prominent forms of vegetative reproduction which are afforded by our native mosses; I have only to add a few remarks on their general relations. In the first place, as we should expect, the majority of gemmiparous mosses rarely produce fruit. Thus *Tortula papillosa*, *Tetraphis pellucida*, and *Orthotrichum Lyellii* are hardly ever found in fruit; the same is the case with *Zygodon viridissimus*, of which however I was fortunate in finding two or three sporangia a week or two ago. With those mosses in which the gemmae are more highly developed they almost always more or less take the place of the fruit; in other cases, and especially where they are more sporadic and less highly developed, they are merely subsidiary organs, fruit and gemmae both frequently occurring. There are of course exceptions to this, but I think it holds as a general rule, and it is what we should expect from the nature of the organisms and their place in the life of the plant. I think we can trace a gradation from the simplest forms to the most highly developed of these structures, and not only so, but I think their origin may possibly be traced to a very ordinary structure in mosses. Anyone who has examined a number of different

species with the microscope will have noticed that in many kinds the leaves are extremely papillose, that is to say the cells, instead of forming a plane surface to the leaf, which would be the case if their external surfaces were flat, bulge out more or less in the centre of each, so that the surface of the leaf is covered with undulations or studded with innumerable projections. They are more frequently found on the lower surface than the upper, but sometimes on both; and they vary in form and size from being merely slight swellings, which give an undulating appearance to the leaf, to such as are found for instance in *Orthotrichum Lyellii*, whose gemmae I have described above, where they protrude so much that their height is sometimes three or four times as great as their breadth, and they appear rather as cylindrical tubes or short hairs than mere protuberances of the cells. Now in the earliest stage of the gemmae in this plant there is nothing to distinguish them from one of these papillose cells, in fact they seem to arise simply as an abnormal development of these papillae; soon however becoming altered both in form and colour from the surrounding ones. When, too, that abnormal outgrowth of protonemoid threads from the cells of the leaf takes place as I have described in *Funaria hygrometrica*, &c., it commences by a protuberance much resembling the papillose structure of the cells of some mosses; so that it seems not impossible that the gemmae have had their origin, in many cases at least, in this ordinary form of leaf-structure. This is, to some extent, also borne out by the fact that in some of the most typically gemmiparous mosses the leaves are more than usually papillose, as for instance *Tortula papillosa*, *Aulacomnion androgynum*, and *Orthotrichum Lyellii*; and indeed the whole family of the *Orthotricheae* is characterized by the papillose nature of the leaf-cells and the frequency of these gemmae, the so-called *Conferva Orthotrichi*.

Supposing then there had been a tendency in the leaves to develop occasionally, whether from the papillae or otherwise, filamentous structures which, as described above, are capable of becoming a protonema and producing new plants, I think we can see how, by means of selection, the more highly developed forms of gemmae might arise. When we consider how extremely simple are the requisites for inducing the growth of mosses, how tenacious they are of life under the most unfavourable circumstances, how small the amount of nutriment they require, and how little they appear to be subject to the ravages of vegetarianism, whether human or otherwise, it is evident that something is needed beyond external adverse circumstances to prevent the incalculable increase which would otherwise take place. There can be no doubt that this increase is prevented, in great measure, by the struggle for existence, and this as well between different kinds of mosses as between mosses and other forms of vegetation. Now we have seen that a patch of moss is preceded by a protonema which covers the ground, some-

times for several square inches, with a thick mat of interwoven filaments, which effectually puts a stop to any new growth of moss in that spot. Moreover, this protonema, which in the majority of cases dies off soon after the plant has obtained a firm rooting and is able to support itself, in some species remains for a much longer period, even until the plant has matured its fruit. May not this be a special adaptation to retain the ground inhabited by the plant until, by the scattering of its new spores, it is able to maintain its own by a fresh growth of protonema?

The formation then of a protonema appears to give a title to possession, and this will be the more easily accomplished in proportion to the number of reproducing organisms which the particular species can produce and distribute. We may therefore assume that it is of great importance to any species of moss to form a large number of reproductive centres, and in those cases where, as in a large number of our species, the normal organs of reproduction are never or are rarely matured, there is the greater need of *special* forms by which the species may be perpetuated. Now suppose that as we have seen is the case with some mosses an abnormal growth of the leaf-cells occurred sporadically, those individuals in which it took place would have undoubtedly the best chance of perpetuating their kind, and in the offspring of these there would remain the inherited tendency to produce the abnormal growth. In this way we should have a regular instead of a merely sporadic growth of cell-tissue into a pseudo-protonema, capable of reproducing the mature plant. Now the advantages which might lead to the development of this form into what is more exactly distinguished as a gemma are obvious. In the first place, it would be of great advantage if the protonemoid filaments were capable of separation from the parent plant, and of growth after separation; and, secondly, it would be a great facilitation of this separation and distribution as well as an economising of energy, if the growths were limited to a certain size and form while still on the plant, which after separation were capable, under the necessary conditions, of enlargement by the recommencement of growth. Thus we should have precisely the form of gemmae which we find so frequently, differing comparatively little in appearance from a short portion of the filament which develops from them. The only further stage to be arrived at is that of their position on the plant. It is possible that this may be an adaptation to the action of insects in their distribution. I should think some agency of this kind is necessary for their dissemination, and, if so, they might easily be carried away by adhering to the limbs and hairs of insects crawling over the plant, in the same way that pollen is carried off by bees and other insects from flowers. In that case, or even, though to a less extent, if the wind be the chief instrument in their distribution, it would be of advantage to the plant to produce its gemmae, first on the upper side of the leaf rather the

the under, and then in regular and prominent positions on the leaf, such as along the nerve, as in *Tortula papillosa*, &c., on the margin of the leaves, as in *Orthotrichum Lyellii*, and on the apex of the leaves, as in *Ulota phyllantha*. Nor would it be a much greater step to the form they take in *Aulacomnion*, &c., where they are collected on the top of what is either the ordinary axis of growth with the foliage leaves aborted, or an extraordinary prolongation of this axis with the leaves undeveloped. I should mention, however, that in the case of *Tetraphis pellucida*, Dr. Braithwaite does not consider the gemmae to be corresponding forms to those on the leaves of other species, but rather as altered antheridia; he does not give any other reason than that the tufts of gemmae are altered male inflorescences, which fact is shown from the occasional presence of paraphyses (rudimentary structures which occur in company with the ordinary reproductive organs), and that the heads are sometimes found in pairs, as is frequently the case with the male inflorescence. I do not know why true gemmae should not occur in an altered form of the male receptacle as well as at any other point of the stem; the vegetative filaments arising from the root-hairs, which bear some analogy to the gemmae, are certainly formed throughout the stem; and this would, I think, be less remarkable than that the antheridia should be changed into articulated organs capable of asexual reproduction. Nor do I gather from Sachs' account of them that he considers them as altered antheridia; but in either case it does not affect the question of the development of the gemmae generally.

I do not mean to lay any stress on this attempt to explain the origin and development of these structures; I have not studied the question sufficiently, nor is enough known, I think, about the manner in which they are disseminated, or the relative importance of the part they play in the perpetuation of the species, to decide the question; I have merely given it as an attempt to show one way in which, by means of the principle of selection they might, with some degree of probability, be supposed to have been developed. The laws of inheritance, variation, &c., have not been so clearly shown to hold, indeed from the nature of the organisms themselves they cannot be expected to be so clearly shown, in the lower plants; but if it should be thought that I have attributed too much to the power of selection in preserving advantages of small consequence, I would draw attention to the fact that advantages which directly affect the reproductive system of organisms are naturally more easily seized upon and more effectively retained than those which affect only some of the more indirect factors in the life of the organism. We can see, for instance, that a variation tending to increase the number or the vigour of the seeds of a plant, would be much more likely to be fixed by the action of natural selection than one which only tended to improve the form of the leaf, or some other comparatively subsidiary organ.

I have now tried to give some account of the vegetative organs of reproduction in mosses, and more especially of those forms which may be obtained in our county. They play a larger part in the perpetuation of the various species than in any other of the more highly developed groups of plants, and as they are so frequently the only means of reproduction which exist, they deserve a proportionate amount of attention, and that attention is, I think, rarely given to them by those who are commencing the study of mosses; and yet their structure and development are quite as easily observed as the usual reproductive organs. I have done little more than notice their chief characteristics in this paper, but it will be something if I have directed attention to an interesting phase of an important class of plants, the study of which, far too generally neglected, will always afford interest to the student, and, in the present state of our knowledge, may be continually adding new and valuable information.

DRUCE'S FLORA OF OXFORDSHIRE.

THE study of Botany seems to thrive in Oxford. The *Athenæum* announces that Mr. G. Claridge Druce, F.L.S., is preparing a "Flora of Oxfordshire." The Flora is intended to be not only a catalogue, but a history of Oxfordshire plants, and of the botanists connected with the University and County. The botanical divisions of the county will be based on the river drainage, the old authors from 1550 downwards will be freely quoted, and the Herbaria at the Oxford Garden, the British Museum, etc., and in the possession of private individuals, will also be consulted. With the Flora will also be incorporated the large number of MSS. notes left by the late Alfred French, of the British Museum, and the previously unpublished notes of Mr. W. H. Baxter, of the Oxford Botanic Garden, and much assistance will also be given by the Rev. W. W. Newbold, M.A., Rev. A. Robertson, M.A., of Hatfield Hall, T. Beesley, Esq., of Banbury, Bolton King, Esq., of Balliol, F. T. Richards, Esq., M.A., Trinity, H. M. Ridley, Esq., British Museum, The Lord Selborne, Rev. W. Marshall, Rev. F. W. Bennett, etc.

THE BOOK OF NATURE.

A ROYAL FOREST.

THE Book of Nature is a book of poetry—a book of epics, pastorals, and lyrics. From the early days while yet the earth was shrouded in darkness ; while the rocks were being formed ; before the Almighty voice was heard bidding the light to break upon the rough round globe—the first great epic of the world was being written, the wondrous pages of which men are to-day reading in the marvels that have been hidden away so long from their eyes—the epic of the rocks ; and when the light of the sun, the moon, and the stars shone upon our earth ; when it was admitted into the circle of heavenly worlds ; when the Angels of God were ever passing to and fro, it was clothed in a mantle of resplendent glory, remnants of which still remain to us ; then there were gardens in which even the presence of God was to be found.

We may dream of the world and vainly endeavour to picture its glory before the blight of sin fell upon it—before the thorns and thistles came to choke the soil ; but we must ever fall back upon the world of to-day—our world. And what marvels of beauty are still left to us ! We look upon the small seed cast into a few handfuls of soil of our earth, and presently there appears the delicate plant that grows in strength and beauty ; then comes forth blossoms, gorgeous in colour, rich in odour, exquisite in symmetry, and our souls rejoice in the resplendent form that has sprung from the small heap of soil into whose bosom we had cast our small seed. These are the fairy forms that clothe our earth. There are besides giant forms that throw up their heads towards heaven, that wrestle with the angry winds, that live thro' the icy breath of winter, that grow in strength and give vigour to the heart of man. These are the great forest trees.

All the strong races of men have been lovers of the forest ; and we see in the most degenerate of the race some remaining traces of this love, for the man who will spend his life fretting his soul in a dingy room of a dingy city, when he comes to the borders of the grave, will strive to find a home for the last few feeble years of his life under the shadow of the trees.

We all love the forest. As, on entering some grand minster we feel an inexpressible awe that words cannot relate, so on entering the depths of the forest the same emotion fills our heart ; and tho' we have not the sombre gloomy majesty that overhangs the pine-clad heights of Alpine fastnesses, nor the awe-inspiring terrors that are to be felt in the new world forests, we

still have some majestic spots in the Royal Forests of our own land, even in our own county.

The history of the forest is as full of interest as the history of a city. It has its antiquities, its ancient laws, its connection with the common-wealth, as does the walled-in town ; but the searcher after the antiquities of nature has not to bemoan the shattered walls where men have met in deadly strife ; his path lies thro' the overarching glades of the forest, every step is masked by clusters of flowers, by masses of ferns, by the bright glitter and sparkle of the sunbeams falling thro' the mazes of the foliage ; and here and there he will find some ruin of nature—some mighty tree standing alone, worn by time—the now thin thread of life creeping up the shell of the once iron trunk, and throwing out a few tender leaves as in the days of its youth—the days of long ago—when the knights might be battling to free the Holy city from the power of the infidel ; or while William and his Normans were parcelling out the land among themselves ; or while the Saxons or Danes were ravaging the religious houses where was stored the treasures as in the palaces of kings.

Passing from the relics of nature, upon which so many generations of men have looked—so many storms have fallen, we come upon one of the *fair* tales of the forest. For not only has the forest history, and poetry, and law, but it has its romance, its stories for the children, its pixies and fairies that sported in the deep glens by the small silver streams, when the moonbeams fell in cascades of light thro' the dark branches. Here is the glen—the haunt or home of the small forest children—the home, for did they not hide beneath the leaves, or in the cups of the flowers, feeding upon the honey drops that lie therein, and drinking of the dew that ran down the tiny petals ; sleeping during the day to come out at night to gambol at the root of some favoured tree, scampering away at the sound of human foot steps, yet sometimes seen tripping it in the mazes of the dance. This is the *fair* glen, covered with brambles, festooned with honeysuckle and wild roses ; and there, down in the depth beneath the overhanging ferns, is the silver stream flowing over moss-grown pebbles, silent as the great forest itself, but here and there breaking into a sweet rippling song like the first soft twitter of the young birds.

We lovers of nature enter the forest as we would a king's palace, for is not the forest one of the royal dwelling places of nature ? Is it not a treasure house, in which is to be found all that is most beautiful, most delightful for man to look upon, to contemplate, or to listen to ?

But a few days since we were rambling thro' the labyrinth of Salcey Forest—one of the royal forests of our county. What thoughts crowded upon us ! Not only all the glories of nature that are around and above, but the memories that gather about it. It is a forest of oaks, some in all the glory

of youth, others in the prime of their strength, throwing out their branches, firm as beaten iron, while the roots delve into the earth and rock, drinking up the strength that lies hidden there. The leaves are as soft and beautiful as the wing of the dove, and the great trees grow from strength to strength until they are fit to be made up into those mighty ships, in which we do battle to break down or uphold an empire. But these are visions of the future when man shall have marked them for his purpose in the world. We are now in God's world full of silence and beauty. The butterflies with crimson-tipped wings are floating and gamboling in the sunbeams. At every step we are startled by something new, something wonderful. It may be a bright-winged insect, gorgeous in all the colours of the queen of summer, a child of the sunbeams, as not belonging to this cold damp chilly world of ours, or a little flower hidden among the long grasses, or a blossom swinging in the breeze that casts its sweet breath thro' all the forest.

There is no sound to be heard but the soft lullaby of the wind and the song of the birds. I had not gone to the forest to gather samples. I am only one of the dreamers over the world's great Book of Nature. But what treasures lie in the great forest for the workers. I had watched the birds and insects, and the wild creatures as they went about the daily business of their lives; they had all been busy feeding their young. Who has not loved to watch the bright little beetle climbing so hurriedly over every obstacle, anxious to reach its snugly-built house; and also its great dull, heavy, sleepy kindred that seem as tho' left behind in the advancement of the insect world; and all the other ten thousand creatures that live under the shadow of the trees or among the brambles and branches.

It is evening, and the students are bringing in the specimens they have found in the wide domains. What wonderful bunches of flowers—wild flowers, some one will say!—Yes! wild flowers growing in freedom under the wide heaven, with every wind to blow upon them—to sweep over them. Some so delicate that you would think a rain drop would crush them; still they live sheltered by the hand of the planter of all the great garden.

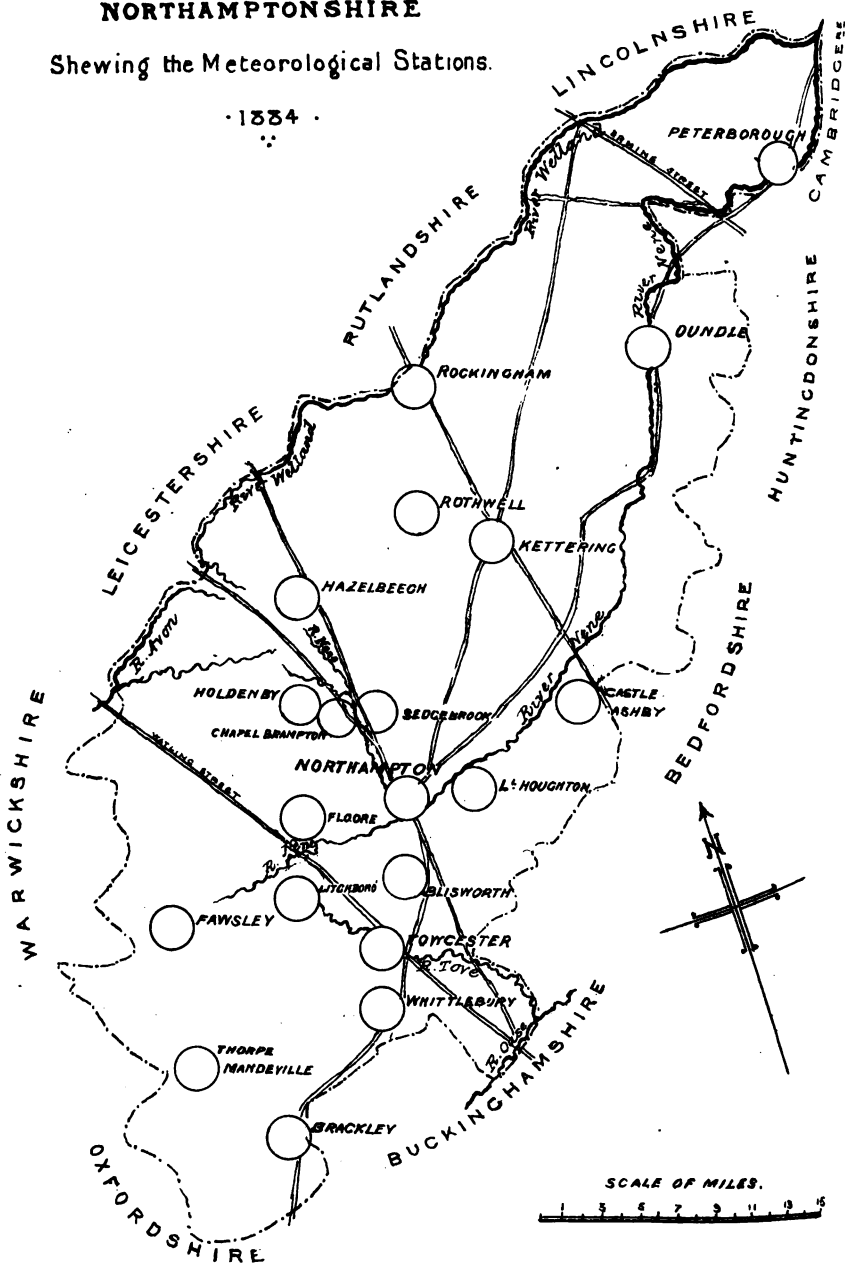
The sun was sinking behind a mass of snowy clouds, and the pearly light fell in long bright shafts that reached from heaven down to earth. All the inhabitants of the forest had ceased from toil and were making holiday, and one could fancy as the shades of evening fell upon the mighty mass of foliage that all the fairy stories were true, and that the elves might start from any sheltered nook and hasten away affrighted at the intruder. But if there came no fairy forms, the moths that floated about like snowflakes, and the sweet wild notes of the nightingale, carried us into a world that was a fairy land; and we felt, as the silence of the night deepened upon the forest, that we were indeed leaving one of the Royal Palaces of Nature.

W. BARTON, Preston Deanery.

NORTHAMPTONSHIRE

Shewing the Meteorological Stations.

1884



LIST OF METEOROLOGICAL STATIONS IN NORTHAMPTONSHIRE, SHEWING THE INSTRUMENTS IN USE, &c. JULY, 1884.

Watered.	Station and Name of Observer.	Latitude.	Longitude.	Height.		Rain Gauge.	Distance of nearest Building or Tree, and Height.		Maximum and Minimum Name.	Form of Thermometer.	Have the Barometer been Verified at Place.	Stand or Screen.	Time of Observations.	Slope of Ground, &c.	Geological Formation.
				Above and below obtained.	Above Ground.		Has it been Verified.	Building or Tree, and Height.							
None ..	Northampton, H. Terry	52° 14' N	0° 54' W	270 ft.*	5 ft.	5 ins.	No	Tree 20ft. high, 9ft. distant	Mercurial, N. & Z.†	Spirit	No	Board fixed on a Wall	9 a.m.	Level..	Rock—dry
	Northampton, F. Law	52° 14' N	0° 54' W	230 ft.*	6 ft.	5 ins.	No	Tree 30ft. high, 18ft. distant	Mercurial, N. & Z.†	Spirit, Hollis	Yes	Screen in shade	9 a.m.	Level..	Rock—dry
	Castle Asby, R. G. Scriven	52° 14' N	0° 46' W	248 ft.*	1 ft.	5 ins.	No	Building 8ft. high, 90ft. distant	Mercurial, Casella	Spirit.	Yes	Stevenson's Screen	9 a.m.	Level..	London Beds of Gt. Oolite
	Blisworth, Josh. Westley	52° 11' N	0° 56' W	214 ft.*	4 ft.	5 ins.	No	Nothing near	..	..	..	..	8 a.m.	Slopes slightly N E	Clay—damp
	Floore, E. G. Loder	52° 14' N	1° 4' W	200 ft.*	1 ft.	4 ins.	No	Ditto	Mercurial, Casella	Spirit	Yes	Stevenson's Screen	9 a.m.	Slopes slightly N E	Lower Lias
	Fawley, Lady Knightley	52° 12' N	1° 11' W	477 ft.†	1 ft.	5 ins.	No	Building 50ft. distant	Sizes, Mercurial, F. L. West.	Spirit, & Z.†	No	On N. side of Porch	9 a.m.	Level..	Clay—Oolite
	Chpl. Brampton, E. Dowdall	52° 19' N	0° 56' W	..	3 ft.	5 ins.	No	Nothing near	..	..	..	..	9 a.m.	Level..	Gravelly
	Sedgebrook, C. A. Marham	52° 18' N	0° 55' W	311 ft.*	1 ft.	5 ins.	No	House 112ft. distant	Mercurial, N. & Z.†	Spirit	No	Stevenson's Screen	8.30 a.m.	Slopes slightly W N W	Ironstone Rock
	Goldenby, J. Gregory	52° 19' N	0° 59' W	437 ft.*	1 ft.	5 ins.	No	Trees 6ft. high, 10ft. N. distant	..	..	..	..	9 a.m.	Level..	Ironstone Rock
	Hazalbesch, Mrs. A. Pull	52° 24' N	0° 56' W	..	6 ins.	5 ins.	No	Hedge 12ft. high, 21ft. do.	Sizes, Mercurial, Divree	..	Yes	On a N. Wall of House under balcony	8.30 a.m.	Slopes slightly N E	Damp
	Kettering, C. W. Lane	52° 23' N	0° 43' W	300 ft.	6 ins.	5 ins.	No	Nothing near	Sizes	..	No	On N.E. Wall of House	9 a.m.	Slopes slightly N E	..
	Oundle, S. P. Holloway	52° 30' N	0° 29' W	104 ft.*	1 ft.	5 ins.	No	..	..	..	..	..	9 a.m.	..	..
Welland..	Peterborough, J. Whitwell	52° 35' N	0° 16' W	50 ft.	2ft. 6	9 ins.	No	Tree 14ft. high, 10ft. distant	..	..	..	..	8 a.m.	Level..	..
	Rothingham C., H. White	52° 31' N	0° 44' W	400 ft.	3 ft.	5 ins.	No	Nothing near	Sizes, N. & Z.†	..	No	Screen	9 a.m.	Nearly level..	Clay—very wet
Tore	Townstall, J. Webb	52° 19' N	0° 55' W	..	1 ft.	5 ins.	No	Ditto	..	..	..	..	9 a.m.	Level..	Clay—damp
Onze	Babbly, E. Durran	52° 1' N	1° 3' W	400 ft.*	6ft. 10	8 ins.	Yes	Wall 4ft. distant, 18ft. high	..	..	..	..	9 a.m.	Level..	Sandy—dry

V. LAW.

† Negretti & Zambra.

† Barometrical Measurement.

* Ordnance Survey.

METEOROLOGICAL REPORT AND OBSERVATIONS.

APRIL.

THE excess of temperature, which has been a common feature of the weather for some months past, has received a check, and we have at length to deal with a month in which both the temperature and rainfall were below the average. The mean temperature for the month was 45°, the maximum registered varying from 67° on the 3rd to 45° on the 18th; the minimum varying from 47° on the 3rd to 25° on the 23rd. The rainfall, 1·48 in., was 0·34 in. below the average of the last fifteen years. The barometer ranged from 29·10 ins. on the 5th, to 29·85 ins. on the 14th. A very severe shock of earthquake occurred throughout the Eastern counties on the 22nd, more particularly in Essex, where a great amount of damage was done to property; it was also felt in the Midland, Western, and South-western counties; also by several persons in Northampton and surrounding villages.

MAY.

May was a bright and very dry month; rain fell on 10 days only, registering 0·90 in., or 0·81 in. below the average of the last fifteen years. The mean temperature, 53°, was the average for the month; the variations of the maximum thermometer were from 53° on the 1st to 80° on the 24th; the minimum thermometer varying from 33° on the 1st to 53° on the 16th. The barometer ranged from 29·15 ins. on the 3rd and 4th to 30·25 ins. on the 22nd. A thunderstorm passed over the town on the 12th, from 7 to 8 p.m., the rainfall being very heavy.

JUNE.

This month was excessively dry, rain falling on six days, to the depth of 0·74 in. only, or 1·54 in. below the average of the last fifteen years. The mean temperature, 59°, was up to the average—the maximum registered being 84° on the 13th, the minimum being 35° on the 1st. The barometer was very steady the whole of the month, varying only from 29·40 ins. on the 7th to 30·15 ins. on the 15th. The wind was very light, varying principally from E. N.E. to N.W. during the whole of the month; an anticyclone, hanging over nearly the whole of the country from the 10th to the end of the month.

F. LAW.

APRIL, 1884.

STATION.	OBSERVER.	RAINFALL.					SHADE TEMPERATURE.			
		Total for Month.	Total for Year.	Greatest Fall.	Wet Days.	In. Date.	Maximum.		Minimum.	
							Deg.	Date.	Deg.	Date.
Northampton ..	H. Terry	1.52	5.61	0.33	6	12	60	2 & 3	28	22
"	F. Law	1.48	5.24	0.32	6	13	67	3	23	24
Castle Ashby ..	R. G. Scriven	1.23	5.79	0.27	6	13	60	29	28	24
Litchborough ..	Ed. Grant	1.99	7.72	0.43	6	17	67	29	21	21
Sedgebrook	C. Markham	1.27	5.32	0.31	6	16	66	3	23	23
Rothwell	J. More, M.D.	1.33	4.24	0.21	6	16	..	..	..	..
Oundle	S. P. Holloway	1.55	4.87	0.26	28	15	..	..	..	..
Towcester	J. Webb	1.50	7.00	0.32	6	14	..	..	..	..
Little Houghton ..	J. Brawn	1.48	5.76	0.36	6	16	58	3	36	23
Fawsley	Lady Knightley	2.02	6.50	0.31	6	16	61	2	24	22
Thorpe Manville ..	Seth Barnes	2.21	7.84	0.45	6	13	..	..	..	..
Floore	E. G. Loder	1.59	..	0.33	7	10	62	3	20	23
Whittlebury	W. S. Miller	1.73	7.58	0.36	6	13	61	3	18	22
Hazelbeach	Mrs. Albert Pell ..	1.69	..	0.46	6	10	..	..	..	..
Rockingham. Csth.	H. Wate	1.78	5.91	0.22	20	14	..	..	..	..
Holdenby	J. Gregory	1.67	6.64	0.37	6	15	..	..	..	..
Kettering	C. W. Lane	1.64	5.55	0.28	2	16	..	..	..	..
Peterborough	J. Whitwell	1.50	4.69	0.24	12	14	66	2 & 3	27	23
Average 18 years 1866-83	H. Terry	1.51	7.87	..	..	..	..	..	..	..

MAY.

Northampton ..	H. Terry	0.90	6.51	0.27	12	9	71	24	37	4
"	F. Law	0.90	6.14	0.41	12	10	80	24	33	1
Castle Ashby ..	R. G. Scriven	1.27	7.06	0.50	12	10	79	24	33	6
Litchborough ..	Ed. Grant	1.30	9.02	0.66	12	11	81	24	35	5 & 6
Sedgebrook	C. Markham	1.36	6.68	0.53	12	11	78	24	33	21
Rothwell	J. More, M.D.	1.16	5.39	0.85	12	7	..	..	..	..
Oundle	S. P. Holloway	1.13	6.00	0.55	12	9	..	..	..	..
Towcester	J. Webb	0.92	7.92	0.32	12	9	..	..	..	..
Little Houghton ..	J. Brawn	1.55	7.31	0.89	12	11	61	11	41	30
Fawsley	Lady Knightley	1.03	7.53	0.29	4	10	70	23	35	6 & 20
Thorpe Manville ..	Seth Barnes	0.78	8.62	0.21	2	9	..	..	..	..
Floore	E. G. Loder	1.21	..	0.60	13	6	75	24	32	1
Whittlebury	W. S. Miller	1.26	8.84	0.37	12	9	78	24	25	20
Hazelbeach	Mrs. Albert Pell ..	1.17	..	0.46	11	8	76	10	41	21
Rockingham. Csth.	H. Wate	2.01	7.92	1.18	12	7	..	..	..	..
Holdenby	J. Gregory	1.67	8.33	0.71	12	10	..	..	..	..
Kettering	C. W. Lane	1.30	6.85	0.71	12	10	78	23	33	7
Peterborough	J. Whitwell	1.42	6.11	0.72	12	7	78	23	36	4 & 6
Average 18 years 1866-83	H. Terry	1.70	9.05	..	..	..	..	..	..	..

JUNE.

Northampton ..	H. Terry	0.66	7.17	0.81	29	5	73	28	43	8
"	F. Law	0.74	6.88	0.31	29	6	84	13	35	1
Castle Ashby ..	R. G. Scriven	1.14	8.20	0.36	29	7	81	13	42	2 & 3
Litchborough ..	Ed. Grant	1.12	10.14	0.25	28	9	85	13 & 25	36	1
Sedgebrook	C. Markham	0.87	7.55	0.29	29	8	82	28	31	1
Rothwell	J. More, M.D.	0.80	6.19	0.30	8	9	..	..	..	..
Oundle	S. P. Holloway	0.54	6.54	0.26	8	8	..	..	..	..
Towcester	J. Webb	0.99	8.91	0.50	29	7	..	..	..	..
Little Houghton ..	J. Brawn	0.88	8.19	0.41	29	7	62	27	44	7
Fawsley	Lady Knightley	1.36	8.89	0.53	28	7	75	28	43	8 & 10
Thorpe Manville ..	Seth Barnes	1.23	9.85	0.70	29	5	..	..	..	..
Floore	E. G. Loder	1.44	..	0.62	31	5	79	14 & 29	33	1
Whittlebury	W. S. Miller	1.13	9.97	0.48	25	6	79	28	37	18
Hazelbeach	Mrs. Albert Pell ..	1.19	..	0.38	8	5	80	28	31	2
Rockingham. Csth.	H. Wate	1.11	9.03	0.30	8	7	..	..	..	..
Holdenby	J. Gregory	1.27	9.60	0.31	29	7	..	..	..	..
Kettering	C. W. Lane	1.09	7.94	0.29	6	9	83	28	41	1
Peterborough	J. Whitwell	0.50	6.61	0.28	8	7	82	28	44	2
Average 18 years 1866-83	H. Terry	2.32	11.32	..	..	..	..	..	..	..

HENRY TERRY, SURGEON.

THE FLORA OF NORTHAMPTONSHIRE.

(Continued.)

BY G. C. DRUCE, F.L.S.

BORRAGINÆ, Juss.

1003. *Echium vulgare*, L. Vipers' Bugloss. Native. Walls, hedge banks, and waste places. Local.

First record—Morton's History, 1712. "With white flowers at Rowell."

Ouse, Cosgrove quarries, bridge, Stoke Bruerne; Nene a, Harleston Firs, wall on the Upton Road beyond Melbourne Gardens, formerly abundant on the walls of Northampton Castle; Nene b, near Rowell (M.H.), between Kettering and Rockingham (Wm. Pitt, 1797), Overstone (Mrs. Birch), Stanion (Lewin); Nene c, Oundle field (W. Pitt, 1797), Peterboro' (Paley), Wansford (Bodger), Lilford bridge, Barnwell Castle, Southorpe quarries; Welland, Kirby Hall, Fineshade (Lewin), between Easton and Kingscliffe (W. H. Jones), Stamford Warren, Collyweston, Wakerley, with white flowers.

The walls of the Castle, as above stated, were once adorned with this beautiful flower.

1006. *Pulmonaria officinalis*, L. Garden escape. Rail bank, Roade. Alien.

1009. *Lithospermum officinale*, L. Common Gromwell. Native. Hedges and thickets on calcareous soil. Rare.

First record—Morton's History, 1712. *Lithosperm. Seu milium solis* (J. B.) "In a lane near the Hermitage House, in Brampton Parish."

Ouse, Coppice Moor; Nene a, Brampton (M. H.), Harpole, Salcey; Nene b, Whiston (Miss Brent), Grafton Woods (Lewin), Geddington Chase (Lewin), Yardley Chase, Horton (Rogers); Nene c, Peterboro' (Paley), Wansford (Bodger), Bedford Purlieus, Wittering Heath (Jones), Glapthorne, Southorpe; Welland, Wakerley Wood, (Jones), Blatherwyck (Mrs. Stafford O'Brien), Fineshade.

1010. *Lithospermum arvense*, L. Corn Gromwell. Native cornfields on a calcareous soil. Local.

First record--Notcutt, 1845, Boro' hill, rare.

Ouse, Pury, Wicken road; Nene a, Kingsthorpe, Harleston, Harpole, Gayton, Farthingstone; Nene b, Grendon (Miss Brent), Kettering (Lewin), Overstone (Mrs. Birch), Castle Ashby, Denton (Rogers); Nene c, Peterboro'

(Paley), Wittering, Apethorpe; Welland, Blatherwyck (Mrs. Stafford O'Brien).

1011. *Myosotis caespitosa*, Schultze. Native. Marshy places. Local. May—July.

First record—The Author, 1875.

Cherwell, Spital Farm, Warkworth (French); Nene a, Daventry Reservoir, Harpole, Gayton; Nene b, Grendon (Miss Brent), Overstone (Mrs. Birch)? Castle Ashby (Rogers), Rush Mill Meadows (H. N. Dixon), Delapre, Foxhall; Nene c, Wittering Marsh.

1012. *Myosotis palustris*, With. Forget-me-not. Native. Common and generally distributed.

First record—Notcutt, 1845.

Var. *strigulosa*. Wakefield Lawn (Ouse).

This beautiful plant is extremely abundant by the Nene side almost throughout its length. The poetical references to it are very numerous.

“I found a cross

That made me breathe a prayer upon the spot,

While nature of herself, as if to trace

The emblem's use, had trailed around its base

The blue significant Forget-me-not.” — *Hood*.

1016. *Myosotis arvensis*, Hoffn. Field Scorpion Grass. Cultivated and waste ground, hedge banks, and woods. May to August.

First record—Paley, 1860.

Common and generally distributed throughout the county.

Var. *umbrosa*. Overstone Woods; probably Mr. Rogers. *M. Sylvatica*, Eh., Castle Ashby, is this variety.

1017. *Myosotis collina*, Reich. Dry banks, old walls, etc. April, June. Native.

First record—The Author, 1879.

Ouse, Cosgrove quarries; Nene a, Harlestone, Dallington, Lamport, Danes' Camp, Badby; Nene b, Brigstock; Nene c, Wittering, Southorpe; Welland, Collyweston.

1018. *Myosotis versicolor*, Reich. Native. Dry sandy soil. Local. April to June.

First record—Notcutt, 1845. Boro' Hill.

Cherwell, hedge bank Franklin's Knob (French); Nene a, Boro' Hill (Notcutt), Stowe-Nine-Churches, Harlestone, Dallington, Kingsthorpe, Hunsbury Hill; Nene b, near Kettering; Nene c, Apethorpe (Rev. M. J. Berkeley), Wittering.

1019. *Anchusa arvensis*, Bieb. Cultivated fields on light soil. Local. May—July.

First record—*Buglossa sylvestris minor*, Ger. “In the fields betwixt Aynhoe and Brackley”—Morton's Hist., 1712.

Cherwell, Grimsbury (French), Aynhoe *ut supra* (Morton); Farthinghoe (Beesley); Nene a, Upton, Harlestone, Dallington, Kingsthorpe; Nene b, Overstone (Mrs. Birch), Ecton; Nene c, Wittering Heath (Jones); Welland, Stamford Warren, 1875 (Jones), Easton-on-the-Hill.

1021. *Anchusa sempervirens*, L. Only as a garden escape at Wood Newton (Lewin), and Castle Ashby.

1022. *Borago officinalis*, L. Borage. Denizen—rubbish heaps, waste ground. Rare. May—July.

First record—Paley, 1860.

Nene b, about Hardingstone, Vigo Common, Castle Ashby (Rogers), Thrapstone; Nene c, Peterboro', Lincoln road (Paley).

The beautiful blue flowers of this plant are great favourites of the bees; the herb itself was formerly frequently employed in medicine, 'dusky melancholic' being dispelled by its use. It is still put in claret cups to give a pleasant coolness to the beverage.

1023. *Symphytum officinale*, L. Comfrey. Native. Brook sides and wet places. Rather local. May—August.

First record—Wm. Pitt, 1797.

Ouse, Furtho, rare in this district; Nene a, near Drayton Reservoir (Notcutt), between Newnham and Barby (Notcutt), Kingsthorpe, not common about Northampton; Nene b, Wellingboro', Wood Newton (Lewin), Pytchley, Grendon (Miss Brent), Chadstone (Rogers), Earls Barton; Nene c, Meadows at Isham, Fen Land near Peterboro' (Wm. Pitt, Agric. Surv. of Northampton), Peterboro' (Paley), Fotheringhay, Wittering, Nassington. Var. *patens*, Sibth. Wittering Peterboro', Helpstone, etc., is, I think, distinct.

Symphytum asperrimum was found as a casual near the Sewage Works. The Comfrey is a valuable emollient, but is rarely employed in medicine.

1024. *Symphytum tuberosum*, L. Garden escape? Kirby Hall (Lewin), Castle Ashby (Miss Brent).

Mr. Lewin thought it wild at Kirby.

1025. *Cynoglossum officinale*, L. Hounds' Tongue. Native. Dry road sides, quarries, etc. Local. May—July.

First record—The Author—See Jour. Bot., 1879.

Ouse, Cosgrove quarries, abundant; Nene a, Upton road; Nene b, Brigstock (Lewin), Denton (Rogers); Nene c, Southorpe (Jones), Kingscliffe (Lewin), Farming Woods, Barnack; Welland, Stamford Warren (Jones), Wakerley Wood.

The glabrous variety was found near Southorpe.

1026. *Cynoglossum montanum*, Lam. Native. Bushy places. Very rare. May—June.

First record—*Cynoglossa folio virenti*, J. B. (Morton), 1712.

Morton's record for *Cynoglossa* is generally referred to *Montanum*, but

I have suspicion this Morton intended the green leaved form *C. officinale*, which is actually the plant preserved under J. Baukin's name in the Dillenian Herbarium at Oxford.

Nene b, Geddington Chase by the road sides (Morton); Nene c, Morehay Lawn, in the parish of Kingscliffe (Rev. M. J. Berkeley).

Echinospermum Lappula, Lehm. Casual.

Garden ground, Grimsbury, 1870 (French), Horton (J. Britten), Jour. Bot.

Lentibulariaceæ.

1028. *Pinguicula vulgaris*, L. Butterwort, Native. Bogs. Very rare. May—June.

First record—How's *Phytologia*, 1850. Marshy places in Northamptonshire—plentifully.

Cherwell, Canal towards Kingsutton (A. Beesley), probably lost; Ouse, near Brackley (T. Beesley); Nene b, in several of the little bogs upon the sides of our hills, particularly nigh Harrington and Wellingboro' (Morton's Hist.), Foxhall (Lewin); Nene c, Wansford (Berkeley), Wittering Marsh, 1877—1884.

The disappearance of the *Pinguicula* from all but two localities shows the great change which has taken place in the county, principally through drainage, in the last two hundred years. Probably by this time the plant has disappeared from Foxhall.

1032. *Utricularia vulgaris*, L. Bladder-wort, Ditches. Very rare.

First record—Peterboro' (Paley), 1860.

Mr. Watson marks in *Top. Bot.* as having seen it in Northamptonshire.

THE GREAT ENGLISH EARTHQUAKE.

ON the 22nd of April, 1884, the greatest earthquake of the present century occurred, and although there was no damage done in this county, it seemed to me only right that the earthquake should be recorded in the Northamptonshire Natural History Journal.

In the county of Essex almost all the structural damage was done; Suffolk also suffered slightly.

The shock was also felt in the following counties:—Middlesex, Surrey, Kent, Sussex, Southampton, Berks, Hereford, Buckingham, Oxford, Northampton, Cambridge, Norfolk, Gloucester, Warwick, Leicester, Rutland, Lincoln, Derby, and Chester.

The Essex Field Club has undertaken to examine and report upon the damage done in Essex. I may, however, record the places in this county at which the earthquake was felt as far as I have been able to find out.

The shock occurred between 9 h. 17 m. and 9 h. 18 m., a.m., on the 22nd of April, and there does not seem to be evidence of its reaching the most distant localities, *e.g.*, those 150 or 180 miles distant more than about two minutes later.

As the greater part of Northamptonshire is from 80 to 100 miles distant from Colchester, which was about the centre of the disturbance, probably the true time of the shock in Northamptonshire was 9 h. 19 m. a.m.

BILLING GREAT.—Simultaneously with the shock of earthquake a noise like a clap of thunder was heard and household articles were seen to vibrate.

COTTESBROOKE.—The earthquake was felt by Lord and Lady Erskine and articles in the room oscillated.

CREATON.—Mr. F. Langham felt the shock at Highgate House before

ECTON.—The High Sheriff, C. W. H. Sotheby, Esq., felt the movement as of something falling, and also of someone pushing the door of the room where he was in.
getting up on Tuesday.

EYE.—Mrs. Collins, who was in bed at the time, felt the movement of the bed. Mrs. Stimpson in the same village was advancing to a table at the time, and when in the act of putting her hand upon it, the table received a sudden jerk so noticeable as to startle her.

GUILSBOROUGH.—Lady Cicely Clifton, about 9.20 a.m., was sitting in her chair at the Grange, when she felt the chair move, and turned round to see if her dog was rubbing it.

KETTERING.—The earthquake was felt by residents in the Broadway, Gold Street, and other parts of the town; crockery and light articles being shaken for some seconds.

NASSINGTON.—The Rev. Dr. Barrett reports that the shock was felt here and at the vicarage—the furniture moved and glasses jingled.

NORTHAMPTON.—Mr. Jos. Jeffery reports that at 9.20 a.m., on the Tuesday morning, he and his wife were sitting in their breakfast-room, they both felt the room move to and fro. An old Roman wall, two feet thick, which stood in the garden and was propped up with planks was shaken and the planks fell into the next garden, proving the effect of the shock. Mrs. Newton and Mrs. Alfred Newton, about 9.30, felt the beds on which they were lying heave up. The pictures were shaken, and two vases on the mantel-shelf were so agitated that the lustres struck one another. Mr. Phipps, of Kingswell Street, was sitting in his house reading a newspaper, at 9.20, and felt himself sway in his chair. Mrs. Cook, of Upper Harding Street, also felt the earthquake at 9.20. Mrs. T. Bland, of Upper Mounts, also felt

a vibration about 9.30 a.m. A very strong vibration was felt at the west end of the printing office of this Journal, in Swan Yard; the cases holding the types distinctly moving from side to side, about 9.20.

PETERBOROUGH.—The earthquake was felt here by Mrs. Gardiner, in Lincoln Road; also on the London Road and in Bridge Street. The shock was also felt at Fletton Spring.

PITSFORD.—Mrs. Smart, of Pitsford Lodge, felt the shock about 9.20.

SYWELL.—The shock was felt at the Rectory about 9.30. Bed shook and bed-hangings waived about.

THRAPSTONE.—One or two invalids lying in bed felt a rocking of the bedstead about 9.30.

WATFORD COURT.—The shock was distinctly felt by Lady Henley about 9.20 a.m.

WELLINGBOROUGH.—The shock was felt in many parts of the town, notably in the warehouses of Messrs. Watkin and Messrs. Brown. At the Club the ceiling cracked and fell, and clocks stopped.

WEST HADDON.—The earthquake was felt about 9.15 a.m. An aged invalid alone in her room said her bed oscillated some three or four times in quick succession, and, after an interval of two or three seconds, there was a repetition of the vibrations. The curtains were also seen to move.

The earthquake was also reported to have been felt at the following towns lying just outside the county :—

BANBURY.—The earthquake was distinctly felt, and the general impression is that it lasted a quarter-of-a-minute.

CROWLAND.—The Rev. Long, of Peterborough, being in bed at about 9.20, felt the bed oscillate. The shock he describes as a gyrating one, without noise of any kind.

HUSBANDS' BOSWORTH.—Sharp shock but no damage done.

MARKET HARBOROUGH.—A distinct shock was felt, lasting one or two seconds, followed immediately by another shock. At Messrs. Symington's factory the building rocked so much that the people at work in the lantern room thought it was about to fall.

UPPINGHAM.—Shock felt all round here but not in the town.

STAMFORD.—Two members of the Conservative Association whilst reading papers in the reading-room felt the earthquake.

C. A. MARKHAM.

Sedgebrook,

July 7, 1884.

A PRELIMINARY LIST OF NORTHAMPTONSHIRE MOSSES.

As far as I can learn nothing has hitherto been done towards compiling a list of the mosses of our county. It is with a view to setting this work on foot that the present list is published. It is the result of less than a year's work, and as the localities recorded will show, I have had very little opportunity of working more than the district lying immediately round Northampton; it must be understood therefore that this list makes no pretence at furnishing a moss-flora of the county; but it is much easier to work up such a flora when there is some basis-list to start from, such as I hope this will furnish; and more especially it will, I hope, induce many collectors to assist in the completion of the work, an assistance which can hardly be hoped for unless some beginning of the kind is made.

I hope to continue the work as far as I am able, and I shall be extremely glad of any assistance; notices of unrecorded mosses, or new records of the rarer ones will be especially welcome; I need hardly say that it is very desirable to have specimens of the species recorded.

I must take this opportunity of expressing my hearty thanks to Mr. J. E. Bagnall for his assistance in naming the mosses;—he has most kindly examined all those which I was unable to name or which seemed to require confirmation.

I have not given localities for the commonest mosses; for the rarer ones I have given all that I have recorded, except where it is otherwise indicated.

The nomenclature and the numbering are those of the 2nd ed. of the London Catalogue of British Mosses.

f—In fruit. b—Barren. Where neither letter is put it is to be understood that the plant was in fruit.

H. N. DIXON,

St. Paul's Road, Northampton.

- 37. *Weissia viridula*, Brid. Not common. Church Brampton.
- 40. *Weissia cirrhata*, Hedw. Not common. Rush Mills, gemmiparous;
Harleston Firs.
- 53. *Dicranella varia*, Hedw. Stone quarries, Duston; Yardley Chase.
- 54. *Dicranella rufescens*, Turn. Harleston Firs (b).
- 57. *Dicranella heteromalla*, Hedw. Common. Kingsthorpe, Harleston Firs, Yardley Chase, etc. A form with strongly falcate leaves, usually barren, occurs especially at the foot of trees.

70. *Dicranum scoparium*, L. Common in woods, on heaths, etc. Kingsthorpe Bushes (b) ; Harleston Firs (b) ; etc.
82. *Campylopus flexuosus*, Brid. Rare, Harleston Firs (b).
88. *Campylopus pyriformis*, Brid. Harleston Firs, Kingsthorpe Bushes.
92. *Pleuridium nitidum*, Hedw. Rush Mills (b). This should be found in fruit, to be confirmed.
93. *Pleuridium subulatum*, L. Not uncommon. Harleston Firs, etc.
110. *Phascum cuspidatum*, Schreb. Abundant. Varying in height and length of fruit-stalk.
114. *Pottia cavifolia*, Ehrh. Abundant on the mud caps of our walls. Abington, Kingsthorpe, etc.
115. *Pottia minutula*, Schwg. Rush Mills, Great Houghton.
116. *Pottia truncata*, L. Frequent. Duston, Northampton, etc.
128. *Didymodon rubellus*, B. & S. Not common. Hardingstone (b) ; Abington (b).
129. *Didymodon luridus*, Hornsch. Local. Northampton, Rush Mills, Great Houghton. All barren. On wood and on the ground.
131. *Didymodon cylindricus*, Bruch. Frequent, but barren. Stones, Rush Mills ; mortar of walls, Great Houghton ; trees, Abington ; etc.
148. *Barbula rigida*, Schultz. Local. Northampton, Kingsthorpe, Abington. On the mud caps of walls with the next.
149. *B. ambigua*, B. & S. On mud tops of walls abundantly. Northampton, Weston Favell, Hardingstone, etc.
157. *B. muralis*, L. Very abundant and variable, especially in the size and shape of the leaves and the length of the hairpoint.
158. *B. unguiculata*, Dill. Common. The leaves vary in breadth and the length of the mucro. A form from Great Houghton near var. *b. cuspidata*.
159. *B. fallax*, Hedw. Not very common. Abington (b) ; Danes' Camp (b) ; Church Brampton (b) ; Duston (f). The fruit seems to be rather uncommon about here.
160. *B. recurvifolia*, Schpr. Very rare. Yardley Chase (b).
162. *B. rigidula*, Dicks. Frequent on walls and stones, but always barren. Abington, Hardingstone, Church Brampton, etc.
164. *B. cylindrica*, Tayl. Not uncommon on walls. Rush Mills, Northampton, etc. Always barren.
165. *B. vinealis*, Brid. Foot of a tree, Hardingstone (b).
167. *B. revoluta*, Schwg. Local on walls. Kingsthorpe (b) ; Abington (f) ; Church Brampton (f) ; Great Houghton (f).
168. *B. convoluta*, Hedw. Not common. Rush Mills (b) ; Abington (b) ; Northampton (b).
175. *B. Brebissoni*, Brid. Rare. On trees by water, Rush Mills (b).

176. *B. subulata*, L. Local. Northampton, Danes' Camp.
177. *B. laevipila*, Brid. Common on trees ; occasionally on stones.
178. *B. latifolia*, B. & S. On trees, wood, etc., near water ; always barren. Northampton, Rush Mills, etc. On the ground, Rush Mills. On chestnuts a long way from any water, Abington Park.
179. *B. ruralis*, L. Not very common. Trees, Abington, etc. Wall, Abington. Very fine on thatch, Weston Favell.
180. *B. intermedia*, Brid. . Frequent on stone walls ; mostly barren. Abington, Weston Favell, Hardingstone, Rush Mills (on the ground), Church Brampton, Holmby. All barren. In fruit, Great Houghton.
181. *B. papillosa*, Wils. Not common. On trees. Abington, Rush Mills, Northampton. Barren.
184. *Ceratodon purpureus*, L. Very common and extremely variable. A tall, dark green form occurs on the foot of trees, usually barren, with the leaves broad, and leaf-cells large, regularly quadrate, and chlorophyllose.
188. *Encalypta vulgaris*, Hedw. Rare. Abington (b) ; Weston Favell (f).
193. *Grimmia apocarpa*, L. Frequent on walls and stones. Rush Mills, Hardingstone, Church Brampton, Holmby.
198. *Grimmia pulvinata*, Dill. Very common.
233. *Zygodon viridissimus*, Dicks. Frequent on trees, etc. Always abundantly gemmiparous, and almost always barren. Two or three sporangia, Great Houghton, 1884.
247. *Orthotrichum saxatile*, Brid. Rare. Hardingstone. Church Brampton ; a form with very short setae and calyptra hardly hairy.
253. *O. affine*, Schrad. Abundant on trees, walls, etc.
257. *O. stramineum*, Hornsch. Very rare. Tree, Dallington Heath.
259. *O. tenellum*, Bruch. Rare. Trees, Dallington ; Great Houghton.
261. *O. diaphanum*, Schrad. Common on trees, pales, etc.
263. *O. Lyellii*, H. & T. Frequent ; always barren and gemmiparous. Weston Favell, Great Houghton, Danes' Camp, Yardley Chase, Dallington Heath, etc.
282. *Physcomitrium pyriforme*, L. Common, especially by the sides of ditches, and on mud heaps. Rush Mills, very fine ; Abington, mud-cap of wall ; Northampton, mortar of wall.
285. *Funaria fascicularis*, Dicks. Rare. In a damp field, Kingsthorpe.
287. *Funaria hygrometrica*, L. Abundant. Very fine in the quarries, Duston.
295. *Bartramia pomiformis*, L. Not common. Harlestone Firs.

312. *Webera nutans*, Schreb. Frequent and variable. Harlestone Firs, Kingsthorpe, Northampton, etc. A curious form with the nerve very strongly developed, from Harlestone Firs, Mr. Bagnall thinks may be Wilson's var. *caespitosa*.
314. *Webera annotina*, Hedw. Sandstone quarries, Kingsthorpe, two or three forms; Duston stone quarries; both barren, and without the axillary bulbils.
316. *Webera carnea*, L. The barren plant is common on clay banks by streams and ditches. In fruit, Kingsthorpe quarries.
329. *Bryum intermedium*, W. & M. Abundant on trees, the ground, etc.
336. *B. atropurpureum*, W. & M. Frequent. Walls, earth, etc. Northampton, Hardingstone, Harlestone Firs, etc.
338. *B. caespiticium*, L. Very common.
339. *B. argenteum*, L. Common.
341. *B. capillare*, L. Abundant, and very variable, especially the barren forms.
345. *B. pallens*, Swartz. Kingsthorpe quarries.
357. *Mnium cuspidatum*, Hedw. Frequent. Northampton, Harlestone Firs, Kingsthorpe, etc.
358. *Mnium affine*, Bland. Rare. Harlestone Firs (b).
359. *Mnium undulatum*, Hedw. Common, but barren.
361. *Mnium hornum*, L. Not common. Yardley Chase, Kingsthorpe quarries; the latter a delicate form with complanate leaves.
368. *Mnium punctatum*, Hedw. Great Houghton, Maidwell Dale.
370. *Aulacomnium androgynum*, L. Not common. Northampton, on trees; Great Houghton, on a gate-post. The gemmiparous form.
378. *Atrichum undulatum*, L. Common. Woods, banks, sandstone quarries, etc.
382. *Pogonatum nanum*, Neck. Rare. Harlestone Firs.
383. *Pogonatum aloides*, Hedw. Not common. Kingsthorpe quarries, Duston quarries.
384. *Pogonatum urnigerum*, L. Rare. Harlestone Firs.
389. *Polytrichum piliferum*, Schreb. Not common. Kingsthorpe quarries.
390. *Polytrichum juniperinum*, Willd. Frequent. Harlestone Firs, Kingsthorpe Bushes, etc.
392. *Polytrichum commune*, L. Common. Woods, heaths, sandstone quarries, etc. Var. d. *fastigiatum*, Lyle. Harlestone Firs (b).
396. *Fissidens bryoides*, Hedw. Common.
397. *Fissidens exilis*, Hedw. Wood, Great Houghton.
398. *Fissidens incurvus*, W. & M. Yardley Chase.
408. *Fissidens adiantoides*, Hedw. Abington Park (b).
409. *Fissidens taxifolius*, L. Frequent. Northampton, Great Houghton, Yardley Chase, etc.

413. *Fontinalis antipyretica*, L. Not common. Streams near the Nene, Rush Mills (b).
417. *Cryphaea heteromalla*, Hedw. Not common. Danes' Camp, Abington.
419. *Leucodon sciuroides*, L. Common. Always barren. A form from Maidwell Dale with the branches proliferous, their tips being swollen and giving rise to numbers of minute branchlets.
425. *Neckera complanata*, L. Common, but nearly always barren. In fruit, Yardley Chase, April, 1884, and Lamport, June, 1884. A marked form from Lamport, differing in habit, and with leaves somewhat concave, and margin recurved.
426. *Homalia trichomanoides*, Schreb. Not uncommon. Northampton, Holmby spinnies.
434. *Leskea polycarpa*, Ehrh. Common on trees by water.
437. *Anomodon viticulosus*, L. Not common. Hardingstone, Abington, Weston Favell. Always barren.
443. *Thuidium tamariscinum*, Hedw. Common in woods, on heaths, etc. Always barren so far as I have observed it.
451. *Thamnium alopecurum*, L. Not uncommon in woods, and usually in great quantities where it does occur. Yardley Chase, Holmby Spinnies, etc. Barren.
452. *Climacium dendroides*, L. Rare and barren. Harleston Heath.
454. *Isoetecium myurum*, Poll. Abundant on trees, etc.
457. *Homalothecium sericeum*, L. Very abundant; usually in the barren state. The fruit however is not uncommon.
464. *Brachythecium glareosum*, B. & S. Common. Always barren.
466. *Brachythecium albicans*, Neck. Dallington Heath (b).
467. *Brachythecium velutinum*, L. Common.
471. *Brachythecium rutabulum*, L. Very abundant and variable.
474. *Brachythecium populeum*, Hedw. Frequent.
476. *Eurhynchium myosuroides*, L. Not common. Trees, Weston Favell; on stones, Rush Mills.
480. *Eurhynchium striatum*, Schreb. Not uncommon in woods, etc. Yardley Chase, Duston, etc. Barren.
482. *Eurhynchium piliferum*, Schreb. Rare and barren; Yardley Chase.
485. *Eurhynchium Swartzii*, Turn. Frequent on dry banks. Barren. Weston Favell, Great Houghton, Abington, etc.
486. *Eurhynchium praelongum*, Dill. Very abundant. Most commonly barren.
493. *Rhynchostegium confertum*, Dicks. Frequent. Northampton, Hardingstone, Great Houghton, etc.
495. *Rhynchostegium murale*, Hedw. Not common. Althorp, Abington.

496. *Rhynchostegium ruscifolium*, Neck. Not uncommon. Hardingstone (f); Dallington Heath, submerged and barren.
501. *Plagiothecium denticulatum*, L. Var. b. *sulcatum*, Spruce. Not common. Harleston Firs, Northampton.
509. *Amblystegium serpens*, L. Very abundant.
511. *Amblystegium irriguum*, Wils. By water, Abington; Kingsthorpe. Barren.
513. *Amblystegium riparium*, L. Common and very variable. Frequently barren. Meadows, Rush Mills, a form which Mr. Bagnall says is "near var. *longifolium*." Yardley Chase, a submerged variety.
521. *Hypnum fluitans*, L. By a pond, Yardley Chase (b).
523. *H. Filicinum*, L. Not uncommon. Abington, a fine form; Yardley Chase (b); Kingsthorpe, etc.
535. *H. cupressiforme*, L. Abundant and most variable.
c. *filiforme*. Yardley Chase, Maidwell Dale; both in fruit.
536. *H. resupinatum*, Wils. Yardley Chase.
556. *H. cuspidatum*, L. Common; usually barren. Fruit, Yardley Chase, a submerged form with complanate, pinnate branches, and distant leaves.
557. *H. Schreberi*, Ehrh. Frequent on heaths, etc. Kingsthorpe Bushes; Harleston Firs, two forms; one tawny, almost white, the other bright green. Barren.
558. *H. purum*, L. Common; almost always barren. Fruit, Yardley Chase, June, 1884.
562. *H. splendens*, Dill. Harleston Firs, Yardley Chase. Barren.
566. *H. squarrosum*, L. Common, but barren. Sometimes it is quite prostrate and creeping.
568. *H. triquetrum*, L. Common in woods. Harleston Firs (b); Yardley Chase (f), etc.



MEETINGS OF THE SOCIETY.

MAY. .

6th—Fourteen members present. Mrs. Albert Pell, of Hazelbeech Hall, Miss Griffin, Messrs. H. J. Marshall, E. P. Sherwood, and —. Dyer were elected members. A moss, which has been provisionally named by Dr. Braithwaite *Catherina apiculata*, was shown by Mr. H. N. Dixon; this species is similar only to some species found in North America, and is in all probability new to Europe. Mr. Dixon then read his paper on "Abnormal Mosses," in which he referred more particularly to their mode of reproduction. Various mosses were exhibited under the microscope by Mr. Dixon in illustration of his paper. A vote of thanks for his paper was carried unanimously.

JUNE.

20th—The Microscopical evening—Fourteen members and seven visitors were present. W. S. Clarke-Thornhill, Esq., Rushton Hall, the Rev. H. H. Slater, F.Z.S., Irchester Vicarage, and the Rev. T. Fry, of Oundle, were elected members. Various objects under the microscope were shown by Messrs. A. Kempson, A. E. Durham, J. Gregory, R. Phipps, and H. N. Dixon.

3rd—Ten members present. The following objects were exhibited:—Orchids, by Mr. W. Law; a collection of Fossil Nautili from the Lias, by Mr. B. Thompson. Two very fine Mammoth teeth found near Higham Ferrers, lent by Mr. George Tailby to the town museum; and the following Mosses gathered in the county:—*Fissidens ixilis*, *Zygodon viridissimus*, by Mr. Dixon.

17th—The Microscopical evening—H. Singleton, Esq., of Preston Deanery, was elected a member. The publications of the Glasgow Natural History Society, and some papers by the Rev. H. H. Slater, F.Z.S., presented by the author, were laid upon the table. Microscopic objects were exhibited by Messrs. A. Kempson and B. Thompson.

JULY.

8th—Eight members present. Mr. W. Simpson, 71A, St. Giles' Street, was elected a member. The volumes of the "Ibis," for the years 1879-83, were placed upon the table; these are the gift of Lord Lilford, and complete the set of the "Ibis" up to present date. Mr. B. Thompson, F.G.S., F.L.S., then read his paper on the "Fish and Insect Beds in Northamptonshire." After a few remarks by Mr. W. D. Crick, to which Mr. Thompson briefly replied, the meeting concluded with a vote of thanks to Mr. Thompson for his able and interesting paper, which our readers will have opportunity of reading in the Journal at a future date.

T. J. G.

MIDLAND UNION OF NATURAL HISTORY SOCIETIES.

PETERBOROUGH MEETING, JUNE 25TH AND 26TH, 1884.

The Seventh Annual Meeting of the Union was held at Peterborough during the last week of June. Favoured by glorious weather and a good attendance of members and their friends, the gathering proved a great success.

The Council Meeting was held in the Town Hall on Wednesday, June 25th, at 12-45 p.m., and was attended by seventeen delegates. Reports from the Hon. Secretaries and the Management Committee were read, and the draft of the General Report was read and discussed. Mr. A. W. Wills ably brought forward the subject of the extermination of rare plants, and it was resolved that the Management Committee (on which twenty-four members were elected to serve) should at once consider the question.

The Annual General Meeting was held in the Fitzwilliam Hall, at 3 p.m., on the same day. Previous to the meeting, the members partook of lunch in an adjoining room. About one hundred members and friends attended the meeting, among whom were Sir Hereward Wake and Mr. B. Thompson, F.G.S., Northampton; Messrs. W. P. Marshall, M.I.C.E., C. J. Watson, H. Miller, W. B. Grove, B.A., Thos. Bolton, and J. Rabone, Birmingham; E. de Hamel, Tamworth; H. Pearce, F.L.S., Stourbridge; W. Madeley, George Perry, and — Williams, Dudley; Revs. O. M. Feilden and G. G. Monck, Oswestry; Messrs. T. W. Cave, M.R.C.V.S., and J. T. Jepsen, Nottingham; Dr. F. W. Crick, Bedford; Messrs. F. T. Mott, F.R.G.S., Leicester; G. C. Druce, Oxford, &c., a large number of the members of the Peterborough Natural History and Scientific Society, and the Hon. Secretaries to the Union (Messrs. J. W. Bodger, Peterborough; and W. J. Harrison, F.G.S., Birmingham).

The President of the Union—the Very Rev. Dean Perowne—being unavoidably absent, the chair was occupied by Dr. T. J. WALKER, who read the President's Address, which dealt in a most interesting and thorough manner with the Cathedral of Peterborough, and the discoveries which have been made during the extensive alterations in that grand edifice which are now in progress.

The thanks of the meeting having been tendered to the President for his very able address (which will be printed in the September Number of the "Midland Naturalist"), Mr. W. J. HARRISON read the Annual Report [see July No., p. 201], which was received and adopted.

PRESENTATION OF THE DARWIN MEDAL.

Dr. WALKER then presented the Darwin Medal to Mr. W. B. Grove, B.A., announcing that it was awarded for the original researches of Mr. Grove among the Fungi.

In acknowledging the receipt of the medal, Mr. Grove said that Charles Darwin had done much to raise the so-called "inexact" natural history sciences to the rank of "exact" sciences. He considered the Fungi to merit close and long-continued study, for they were intimately connected with many matters closely affecting the well-being of mankind.

HONORARY TREASURER'S REPORT.

Mr. E. DE HAMEL read the financial statement for the year.

MIDLAND UNION OF NATURAL HISTORY SOCIETIES.

BALANCE SHEET.

		RECEIPTS.		£ s. d.	£ s. d.
1883.	June 12.	Balance of Treasurer's Account	...	2 7 2	
	" 18.	Subscriptions Burton Society for 1883, 174 at 3d.	...	2 3 6	
	July 26.	Subscriptions and Arrears Bedford Society	...	2 5 7	
	"	Nottingham Literary and Philosophical Society	...		
	"	for "Midland Naturalist" ...	...	2 0 0	
1884.	May 21.	Oxfordshire Natural History Society	...	20 at 3	d. 8 16 3
	"	Oswestry and Welshpool Naturalists' Field Club...	...	40 3	0 10 0
	" 22.	Birmingham Philosophical Society	...	129 3	1 12 3
	"	Severn Valley Naturalists' Field Club	...	68 3	0 17 0
	" 23.	Nottingham Naturalists' Society	...	94 3	1 3 6
	"	Bedfordshire Natural History Society and Field Club	...	60 3	0 15 0
	" 26.	Dudley and Midland Geological and Scientific Society	...		
	"	and Field Club	...	100 3	1 5 0
	" 29.	Birmingham School Natural History Society	...	50 1	0 4 2
	"	Peterborough Natural History and Scientific Society	...	112 3	1 8 0
	June 10.	Evesham Field Naturalists' Club	...	35 3	0 8 9
	" 11.	Birmingham and Midland Institute Scientific Society...	...	246 1	1 0 6
	" 13.	Leicester Literary and Philosophical Society	...	268 3	3 7 0
	" 17.	Nottingham Working Men's Naturalists' Society...	...	30 1	0 2 6
	" 18.	Birmingham Microscopists' and Naturalists' Union	...	40 3	0 10 0
	" 20.	Birmingham Natural History and Microscopical Society	...	259 3	3 4 9
	"	Northamptonshire Natural History Society and Field	...		
	"	Club	...	200 3	2 10 0
	" 21.	Caradoc Field Club	...	62 3	0 15 6
	"	Tamworth Natural History, Geological, and Antiquarian	...		
	"	Society	...	96 3	1 4 0
		Balance	...	...	5 6 0
					£35 5 2
		PAYMENTS.		£ s. d.	£ s. d.
1883.	July 31.	"Midland Naturalist" from Nottingham Literary and	...		
	"	Philosophical Society	...	2 0 0	
	"	Balance of Darwin Die Fund	...	0 17 6	
1884.	June 25.	Treasurer's Expenses, stamps, &c....	...		2 17 6
	"	Secretary's ditto	...		0 4 0
	"	Wright, Dain, Peyton, and Co., Printer's bill, 1883-4	...		1 9 6
	"	Joseph Moore, Darwin Medal (bronze)	...		21 19 2
	"	Mr. Grove, Darwin Medallist, bronze medal, and	...		0 4 6
					8 10 6
					£35 5 2

There is a considerable falling off in numbers amongst the Societies in the Union, the total number of Societies having decreased from 23 in 1883 to 19 in 1884, and the gross number of members from 2,416 to 1,965 during the same period; this is mainly owing to the cessation of the Cheltenham, Banburyshire, Burton, and Nottingham G.R.S., and to the general decrease in reported number of subscribing members by the various Societies.

The result of this is that we find the receipts, including the balance carried forward last year and the then outstanding arrears since paid up, amount to £29 19s. 2d. Against this we have to take into account the £2 donation of the Nottingham Literary and Philosophical Society to the "Midland Naturalist," and the 17/6 contra balance of the Darwin Die Fund, together with Treasurer's expenses 4/-. Secretaries' ditto 23/6, Printers' Bill £21 19s. 2d., and Bronze Medal 4/6, total £26 14s. 8d., leaving a balance of £3 4s. 6d. at the disposal of the Council.

It is customary when the Darwin Medallist so elects to present him with the difference in money value between the cost of the gold medal, £8 15s., and of the bronze medal, 4/6, *i.e.*, with £8 10s. 6d.; if this be done the credit balance of £3 4s. 6d. will be converted into a debit balance of £5 6s., and it will be necessary for the Council to consider what steps should be taken to meet this in the coming year.

Votes of thanks were then passed to the Officers of the Union (acknowledged by Mr. W. J. HARRISON), and to the Officers and Members of the Peterborough Natural History Society (acknowledged by Dr. T. J. WALKER).

It was resolved that Mr. T. H. Waller, B.A., B.Sc. (Birmingham) should be elected as Honorary Secretary for the ensuing year, and that Mr. E. de Hamel should be re-elected as Honorary Treasurer.

The meeting terminated with a vote of thanks to the Chairman, proposed by Sir H. WAKE, and seconded by Mr. DE HAMEL.

LOCAL EXCURSIONS.

Immediately after the meeting a large number of the members of the Union proceeded to the Cathedral, where they were met by the Rev. Canon Argles and the Rev. Canon Macdonnell. The former gentleman entered into a long description of the building, giving an account of its early history, and explaining its construction, and the style of architecture. After inspecting the nave the restoration works were visited, and here Canon Argles thoroughly explained the old defects and the reasons for pulling down the central tower. A few of the members went on a botanical excursion to Thorpe Hall (by kind permission of C. I. Strong, Esq.) and Holywell, returning by the River Nene; others paid a visit to the section of cornbrash exposed by the railway.

CONVERSAZIONE.

A very successful Conversazione was held in the Fitzwilliam Hall on Wednesday evening. The tables were arrayed with various objects of local and general interest, scientific, antiquarian, literary, &c., including relics from the Fenland and Saxon and Roman

remains from Castor, Peterborough, and neighbourhood; the collections of flint implements, fossils, and Roman and Saxon pottery, bronzes, weapons, &c., being remarkably good. The objects under the microscopes were of the usual character, and there was a capital fresh-water aquarium. At intervals selections of music were performed by a band, under the directorship of the Rev. W. F. Wilkinson.

In the course of the evening Dr. T. J. Walker delivered a very interesting address on the Pre-historic and Roman Remains found in the neighbourhood of Peterborough, illustrating his remarks by the actual specimens, of which there was a grand display in the numerous glass cases.

Afterwards, in the adjoining hall, Mr. W. Jerome Harrison, F.G.S., lectured upon "The Ice Age and the Stone Age," illustrating his remarks by a number of views, admirably shown by the oxyhydrogen lime-light.

SECOND DAY—THURSDAY, June 26th.

UPLAND EXCURSION TO BEDFORD PURLIEUS.

Leader, Mr. J. W. BODGER.

Starting from Peterborough Market Place at nine o'clock, the "Alpine" party (about thirty-five in number) drove westward to Water Newton, where the river gravels were examined, and where some of the visitors obtained quite a collection of (fragmentary) Roman pottery. After examining Chesterton Church, the drive was continued to Stibbington Hall, where Captain and Mrs. Vipan most kindly and hospitably received the party, and here a very pleasant hour was spent in the inspection of the Indian and Burmese objects of Art, and in strolling through the lovely grounds, the orchid houses, and the aquaria. After thanking the hosts for their kindness, the drive was continued to the most westerly point reached—Bedford Purlieu—a wild, windy region where many rare plants still grow, and where the fly orchis and blue columbine grow freely. After lunch a return was made through Wansford to Sutton Marsh, where the botanists discovered a large quantity of — mud. Peterborough was reached about half-past five, and here the Fenland party were joined at tea in the rooms of Mr. J. House, by whom the whole of the catering for the meeting was carried out in a thoroughly satisfactory manner.

FENLAND EXCURSION—CROWLAND ABBEY.

Leader, Mr. E. J. LILLEY.

The Fenland party took a north-easterly route, and the first point visited was the Decoy, where wild birds are captured during the winter in Borough Fen. The mode of working the Decoy was clearly explained by Mr. T. B. Williams and his sons. Thence the party proceeded by the bank to Crowland, and went direct to the Abbey, where the Rev. T. H. Le Boëuf addressed the company in the belfry on the history and architecture of the Abbey. He afterwards accompanied the party round the venerable pile, and explained the chief features of interest,

commencing with the original Norman door-way, which has but of late been opened up to view inside the porch; from thence he proceeded to describe the figures on the west front and round the nave and south aisle, after which the fine old Norman or Saxon arches of the great central tower were noticed, and the company completed their visit by inspecting the fine old plate belonging to the communion service of the church, and the parish registers, which go back to early in the 16th century. One of the first entries refers to the death of Oliver Cromwell. From the dissolution of the monasteries for a period of 120 years the registers are missing. About 75 years ago the Rev. James Blundell obtained nearly 100 years of the old registers from some person in Cambridgeshire. Should any antiquarian know where the series could now be completed he would confer a great favour on all students of our old records by publishing the information. After lunch at the George Hotel, a vote of thanks was given to the rev. gentleman for the very able address he had given on the Abbey. The Society then adjourned to the remarkable triangular bridge, the history and peculiarities of its architecture and situation being pointed out by Mr. A. S. Canham. The party next inspected, at Mr. Canham's residence, a rare collection of old engravings of the most interesting objects in the neighbourhood, and a very complete collection of the flint implements used by pre-historic man, gathered from a tumulus which was taken down three years ago, when the wash bank was heightened. The party, after heartily thanking Mr. Canham for the pleasure and interest he had afforded, took their carriages, which were awaiting them, and proceeded on their way to Thorney, noting as they went the contact of the three counties, Lincoln, Cambridge, and Northampton at Noman's Land, and Turketell's Cross, standing near to Pepper Lake, in which it lay for many years prior to about 1825, when it was taken out and re-erected. After examining Thorney Abbey a rapid return was made to Peterborough, which was reached in good time for tea and the 6.30 train, by which most of the visitors departed, bearing with them very pleasant remembrances of this well-planned, well-managed, and very successful meeting, for whose success the local members must have worked both hard and well.

[We are indebted to Mr. G. CLARIDGE DRUCE, F.L.S., for the following Botanical Notes.—EDS. M.N.]

The Fenland expedition of the members of the Midland Union furnished little of special interest to reward the botanist. The district traversed, once and at no very distant period the haunt of such plants as *Cladium Mariscus*, *Cicuta*, *Stratiotes*, *Pilularia*, *Teucrium Scordium*, and *Villarsia*, was now covered with rich wheat fields, pleasing to agriculturists, but most barren to botanists; and the dyke-sides, which stretched out in unpicturesque straightness, were bordered only by such plants as *Glyceria aquatica* and *Carex riparia*, and were often too stagnant to show anything upon their surface besides Lemna. Here and there *Hottonia* was welcomed by the Warwickshire botanists, and in a dyke near the Welland occurred a new addition to the Northampton Flora, *Callitriche obtusangula*, a very distinct-looking plant. The far-famed Decoy Farm, in Borough Fen, was also extremely poor in vegetation,

nothing unusual occurring in its osier beds and waters. Nor did Crowland or Thorney yield anything to the botanist.

The Upland party went over much richer ground, and I determined on Friday to make an expedition in that direction; so, taking the train to Wakerley station, I commenced work by searching Wakerley Wood. Here occurred *Asperula odorata*, rare in Northants, *Atropa Belladonna*, confined to the north-east of the county, *Melampyrum pratense* (*M. cristatum* was not in flower), *Ophrys apifera*, *Dipsacus pilosus*, *Echium*, *Verbascum Thapsus*, and *Euphorbia Lathyris*. This latter plant is probably a native here, as it occurs in some of the old woods, as at Fineshade and Wakerley, and Mr. Mott found it by the side of Bedford Purlieus. I made careful search but could find no trace of introduced plants, and one can quite agree with Babington's remark on this italicised plant of the London catalogue—"that it is a native of some stony and rocky woods."

The road between Wakerley and Duddington was bordered with *Crepis biennis*, and a form of *Ballota* occurred, which, in had long calyx teeth, and may be *ruderalis*.

On Colleyweston quarries I gathered *Aceras anthropophora* and *Orchis pyramidalis*, with *Arabis hirsuta*, *Koeleria*, *Avena pubescens*, *Bromus erectus*, and *Brachypodium pinnatum*. The stream, which begins at the White Water, near Stamford, and ends at Sutton Marsh, affords almost the only remaining portion of bog vegetation in Northamptonshire, and very rich it is; a profuse growth of *Juncus obtusiflorus* being especially noticeable. *Sclænus nigricans*, *Eriophorum latifolium* and *E. angustifolium*, *Carex pulicaris*, *C. dioica*, *C. flava*, *C. Hornschuchiana*, *C. stellulata*, *C. intermedia*, *C. ovalis*, *Scirpus setaceus*, *S. pauciflorus*, *S. palustris*, *Anagallis tenella*, *Samolus Valerandi* also occurred.

In a marshy spot I found *Salix pentandra* (probably planted); *Epipactis palustris*, *Gymnadenia conopsea*, *Orchis maculata*, *O. latifolia*, and *O. incarnata* were frequent, the flesh-coloured variety of the latter in full flower on June 27th; a hybrid between *incarnata* and *maculata* was also found. *Carduus pratensis* was rare, and one or two specimens of *C. palustri-pratensis*, near to, if not identical with *C. Försteri*, were gathered.

Menyanthes was in beautiful flower; a short-leaved, much-encrusted form of *Chara fetida* was present in the wetter portions, while the grasses were represented by *Molinia*, *Triodia*, and *Aira cæspitosa*. Here and there, too, were the tussocks of *Carex paniculata*; *Pedicularis palustris* and *Pinguicula* were also seen. It was curious to notice how close to and sometimes even mixed with the marsh plants occurred *Brachypodium pinnatum*, *Polygala depressa*, and *Bromus erectus*, but this was only where the stony soil was close to the surface.

Having traversed some miles of this interesting strip of marsh, I visited the quarries of Southorpe; here occurred *Asperula cynanchica*, *Verbascum nigrum*, *Anthyllis*, *Onobrychis*, *Marrubium vulgare*, etc., but the drought had spoiled the place for botanising. *Chlora perfoliata* was gathered near Ufford.

The river side near Peterborough was not particularly rich; *Sium latifolium*, *Zannichellia palustris*, *Enanthe fluviatilis*, *Potamogeton perfoliatus*, *P. lucens*, *P. pectinatus*, and *P. crispus*; *Ranunculus fluitans* and *R. pseudo-fluitans* were plentiful in the Nene.

In the dyke east of Peterborough, *Hydrocharis*, *Polygonum maculatum*, *Ranunculus sceleratus* (most abundant), *Enanthe Phellandrium*, *Polygonum mite*, *Rumex maritimus*, *Callitriche platycarpa*, and *Iris acoriformis* were the representative plants.

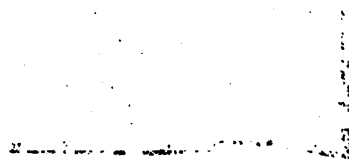
It will be seen from the above list that a fair quantity of specimens may be found even in a short visit to an unpromising-looking neighbourhood, and there is little doubt that systematic search of the district would add several plants to the Northampton Flora.

I must conclude these rough notes by expressing my thanks to the Peterborough Society for their well-planned excursions and meetings, which afforded their visitors much pleasure.

[The following is communicated by the Rev. M. J. BERKELEY.]

If we look back forty or fifty years, it would be impossible to fix on a more hopeful point than Peterborough for interesting research. Three members of the household of the late Earl Fitzwilliam worked out the whole country in almost every point of interest. Mr. Artis, the house steward, made an especial study of the site of Durobrivæ, and though the text of his work was never published, the illustrations command the attention of archaeologists to this day. Mr. Simmons, the head cook, made, with considerable intelligence, a large and varied collection of the insects; while Mr. J. Henderson, the head gardener at Milton, a man of extensive information and original research, worked out not only the botany but zoology, and his paper on the "Germination of Ferns," in one of the earliest volumes of the "Annals of Natural History," still bears witness to his power as an observer and draftsman. This was, of course, before so much of the Fens had been drained, and though perhaps it would be difficult now to obtain specimens of such plants as *Liparis Loeselii*, *Malaxis paludosa*, *Viola lactea*, and the rare fern *Aspidium cristatum*, or *Andromeda polifolia*, diligent research might afford us in Holm Fens *Teucrium Scordium*, and other varieties. But the Soke country, with its woods and varied geology, will still yield us a good harvest of Lepidoptera and other insects, while the woods give us *Imula Helenium*, *Melampyrum cristatum*, with *Listera Nidus-avis*. And if we extend our view as far as Wansford and the neighbouring Bedford Purlieus we might still get, on the outskirts of Thornhaugh, *Chlora perfoliata*; and, if the planting of conifers in the old stone pits at Southorpe has not altered altogether the locality, there would certainly be *Anemone Pulsatilla*, *Hypochaeris maculata*, *Sedum Telephium*, and possibly, for it was once abundant, *Ophrys aranifera*. Beyond Wansford there is a tract of thin soil, which yields every year a rare assemblage of species of *Phascum*, with other mosses, when the corn crop has been secured, while also growing a multitude of annual corn plants, such as *Caucalis daucoides*, *Silene noctiflora*, *Antirrhinum Orentium*, *Euphorbia platyphylla*; and on the roadside, with many a limestone plants, numerous specimens of the Fly Orchis; while the wood itself affords acres of Lily of the Valley, and on the further side of the Purlieus the underwood consists of indigenous specimens of *Tilia parvifolia*, and when the underwood is cut down, the whole land is sometimes blue with the common Columbine, which I think is indigenous there, if anywhere in England. The same country is undoubtedly rich in Fungi, and some part of the district has been thoroughly examined. There is no doubt that if the country were properly searched many species of Truffle would be found. The common English Truffle, *Tuber aestivum*, certainly occurs at Milton. At Apethorpe it is sometimes so abundant that one or more pounds may be collected by experts in a few minutes, and in the lime region of

Bedford Purlieus nearly twenty species have been found. Nearer home we may observe that in the brickfield at Whittlesea the late Dr. Porter made many valuable discoveries, and there is still the same opportunity and hope of novelty, and such rare plants as *Lythrum hyssopifolium* may still reward close research in swampy ground. Much might be added of interest, but to enumerate all the capabilities of the neighbourhood would require a formal paper and more energy than an old naturalist in his 82nd year can command.



OF NATURAL HISTORY SOCIETY

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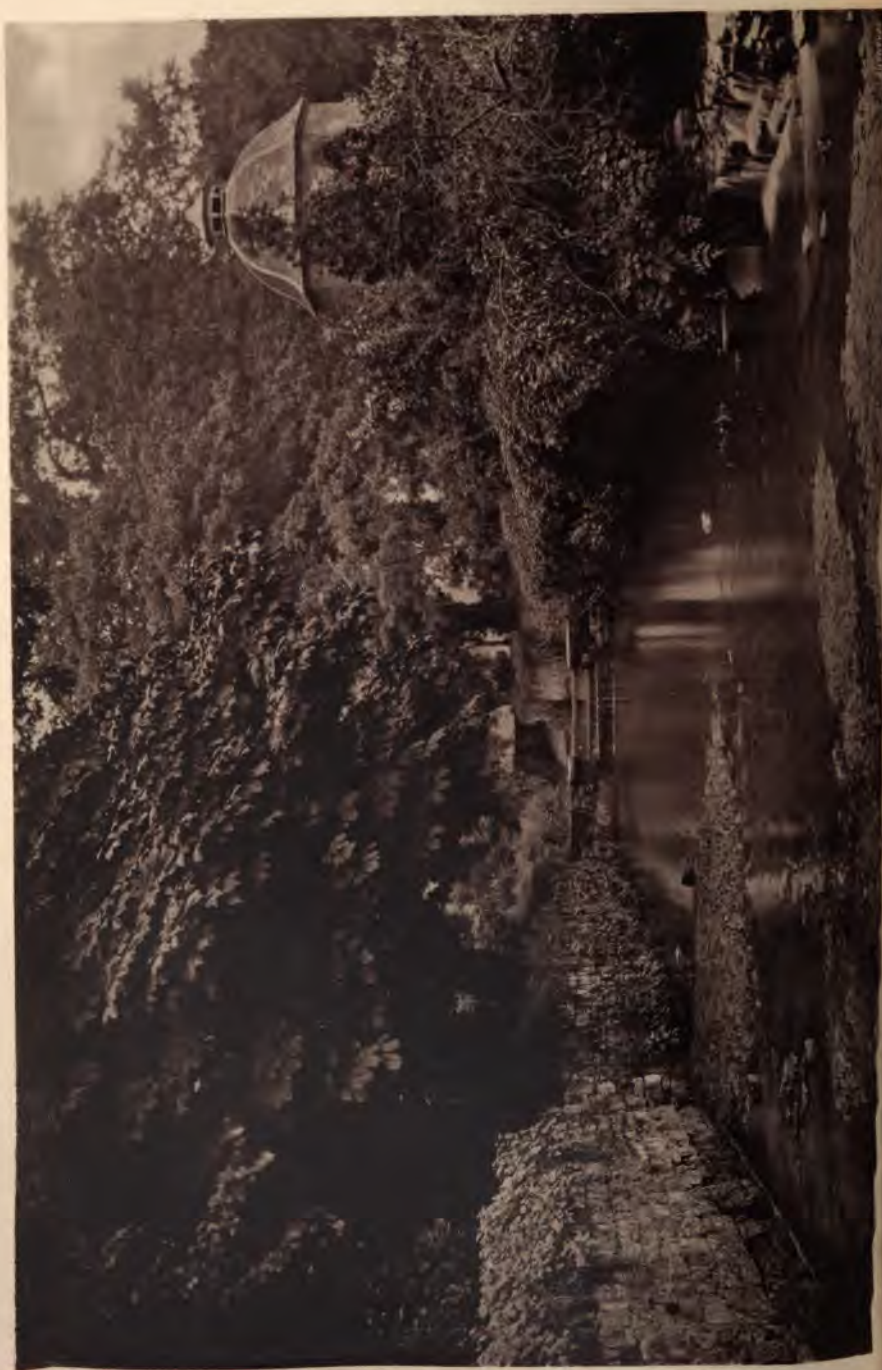
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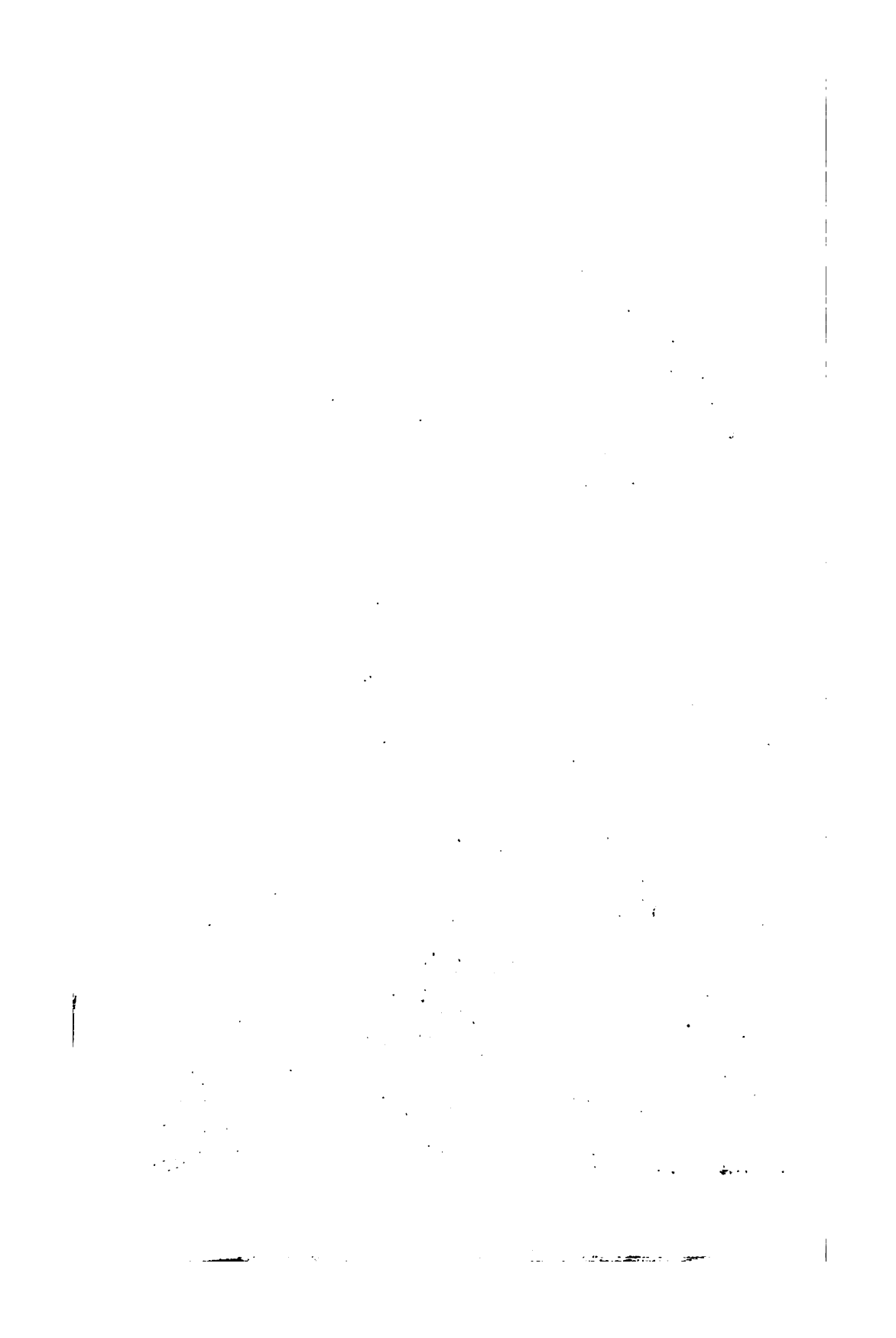
FROM A NEGATIVE BY MR. B. C. CARRUTHERS.



CASTLE ASHBY CHURCH

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MIDLAND UNION OF NATURAL HISTORY SOCIETIES.

ANNUAL MEETING AT PETERBOROUGH.

ADDRESS BY THE VERY REV. J. J. S. PEROWNE, D.D.,

DEAN OF PETERBOROUGH,

PRESIDENT OF THE UNION.

In the name of the Peterborough Natural History and Scientific Society, and as their President for the year, I offer a most hearty welcome to the delegates and members of the Midland Union of Natural History Societies who have honoured us by their presence to-day. It is with the greatest regret that I have to add, that I am unable myself to take any part in the meeting. Unfortunately an earlier engagement, and one from which I have found it impossible to escape, clashed with the time fixed for your gathering here, and for local reasons it was not found convenient to alter the date so as to admit of my delivering this address in person. It would have been a real pleasure to me could I have assisted in receiving the Union; for though I cannot put forth the smallest claim to any knowledge of Natural History or Science, yet I am not the less sensible of the great value of such studies and not the less anxious to do what I can for their encouragement. It is my consolation to know that there are members of the society in Peterborough who can more than make up for my deficiencies, and that you will, therefore, have no reason to regret my absence, sincerely as I regret it myself. I can only wish the meeting every possible success and every member of it the utmost enjoyment during the two days of their visit.

In considering what should be the subject of my address my thoughts naturally turned to the Cathedral. Under ordinary circumstances I should have had nothing new to say on such a subject. So many able and accomplished

archæologists have given us the history of the Monastery and have discussed with infinite labour and learning every detail of the architecture, that little or nothing was left for a new comer on the field to glean. But within the last year and a half we have learnt a great deal about the central tower and the adjacent parts of the building which was not known before. We have been obliged to take down that tower, and in taking it down we have made considerable additions to our knowledge. Like many other misfortunes, this has turned out to be not altogether without its compensation.

Those who remember the condition of the lantern as it presented itself to the eye after the walls were scraped, and as it appeared from that time to the time of its demolition, will remember how it was torn and rent by gaping fissures, and must often have wondered how a building showing such signs of weakness could have held together so long. The condition of the two eastern piers added to the surprise. The north-eastern pier had been partially rebuilt by the 14th century builders; the south-eastern pier had been crushed and peeled by the weight above, and instead of being repaired had been strapped together with wooden uprights and iron bands in the most unsightly manner. Still till near the end of the year 1882 no danger was apprehended. Then a sudden and alarming movement was discovered to be taking place, and immediate action became necessary to save the whole from instant destruction.

Of course the lantern might have been preserved in its existing condition by underpinning and by tying its walls together by iron bolts as has been done in other cases, but the discoveries which were made in taking down the lantern and the piers gave convincing evidence that Mr. Pearson was right in deciding to take them down altogether and rebuild them. The walls of the 14th century lantern were merely rubble and dust, held together by the thinnest facing of Barnack stone. The Norman piers were no better. The core of the piers was dust and the bonding of the stone courses was wretched. The foundations were of the poorest kind, consisting of small stones laid on the loose gravel, though some two feet and a half lower down the builders would have touched the solid oolitic rock. Magnificent as the Norman architects were in design, they were not equally careful as to the soundness of their structure.

In taking down the tower and piers several interesting discoveries were made, of which I shall endeavour to give some account. But before I do this, it may be well briefly to

state the facts with regard to the original construction of the tower and lantern, as we learn them from the ancient chroniclers.

The tower of the Norman Church was built by the Abbot William de Waterville, who also built both the transepts. "In suo etiam tempore (says Swapham) ambæ cruces Ecclesiæ, et tres hystoriæ (*i.e.*, stories which in more classical Latin would have been *tabulata**) *magistræ turris erectæ sunt.*" Mr. Paley infers from this statement that there must have been four stories in all, and that the fourth was added by the next Abbot, Benedict. If so, this central tower must have been a lofty structure, and as we know, it subsequently proved too heavy for the main piers on which it rested. I shall advert presently to the interesting fact that evidence of the existence of three stories in the Norman lantern has been found in taking down the 14th century tower, but no evidence of a fourth. And although Mr. Paley not unnaturally inferred the existence of a fourth from the language of Swapham, "in his time . . . three stories of the principal tower were erected," yet there is no mention anywhere, so far as I am aware, of the erection of a fourth, and I am inclined to think that the fourth was only designed but never erected; unless, indeed, the words of the chronicler may be rendered (which considering the character of the Latin seems not impossible) "*the three stories of the main tower were built.*"

No sooner was the demolition of the 14th century lantern begun, than it was seen that the builders of that period had worked up the old Norman material in the construction of their own tower. On removing the stones of the somewhat richly adorned string-course on which the parapet rested, the stones composing it were discovered to be mostly the caps and bases of the internal arcades of the various stages of the old Norman lantern, these being so disposed that the original carved faces were turned inwards, whereas the ends which had been at first bonded into the wall were now exposed and ornamented with the new 14th century moulding. As the work of demolition proceeded, it turned out that the mass of the stonework, with the exception only of parts of the belfry window-jambs, was the old Norman material re-worked and re-moulded, and (such was the excellence of the Barnack stone) as fresh and sharply cut as when it was placed in its original position. The walls, however, of the lantern were of the poorest possible construction. There was a facing only of the Barnack rag

* Paley.

varying in thickness from about two to six inches, and the whole of the rest of the walls was composed of small fragments, many of them not larger than a man's hand, embedded in rubble and stonedust, or as it is locally called "pit mortar."

Towards the upper part of the lantern the filling in of the wall presented curious fragments of earlier and later work, bits of decorated carving, pieces of marble shafts—perhaps from the west end,—one of the large keeled angle stones from the west front which had been placed in the extreme angles north and south, and portions of decorated plaster screen work, carved, and ornamented with black plaster inlay. There was also found a very large quantity of fragments of monumental cross slabs of Early English and decorated work, some presenting good and elegant designs, and two curious foot-stones, with incised line double crosses. Several of the window-jamb stones had been wrought out of these, the words "HIC JACET" being plainly discernible on one of them; and this use of tomb-stones was carried so far as to include the use of stone coffins for ashlar in two or three instances.

As I have already observed, very considerable remains of the old Norman lantern have been recovered, and the history of the "three stories" of the "master tower" has been fully made out.

First, there are the bases, caps, jambs, and arches of what appears to have been the tower stage or third storey which was shielded from the light on all sides by the then roof.

Secondly, almost all the caps, bases, and parts of jambs, arches, and pillars of what formed the second internal stage (or third, if four existed) and also quantities of the jambs and external arcades as well as of the small blank arcades over them,—a feature similar to what is seen on the present transept gables.

Thirdly, there are considerable quantities of the caps, jambs, arch orders, &c., of the upper stage. This on the interior presented a design of three arches, precisely as in the windows of the clerestory on the east side of the transepts, and like these had probably a small blank arcade above on the exterior.

Further, large portions of the richly zigzagged string over the Norman arches of the crux have been found, as well as of the two moulded strings over it; and also fragments of the shafts at the angles of the interior and of the attached half columns which formed the interior upright division lines of the composition.

In a similar way a great quantity of the external strings and half pillars has come to light. Of the outside work a part still retains the lichened coating with which it became covered when it was in its original position.

It is well worth considering whether in rebuilding the lantern it would not be desirable to make some use of this Norman arcading. There is enough, or nearly enough of it, to reconstruct the whole of the lower or first stage immediately above the arches of the crux. If this is thought desirable, and I confess it appears to me very desirable, there would be no structural difficulty in the way. The arcading would be quite complete above the two Norman arches on the north and south sides; it would be intersected by the pointed arches on the east and west sides of the crux. There would be no interference with the general character of the lantern. It would still tell its tale of the 14th century reconstruction,* and there is no reason why there should not be added to this the tale of 19th century rebuilding.

The addition of this stage of arcading would of course raise the tower to the extent of the height of the arcading. On this, the 14th century tower might still be re-erected. But can nothing more be done? Such a tower would still be low and out of proportion to the great length of the church. Surely something more might be done and a spire would be a grand feature. There are spires on two of the western towers; there was, as late as a century ago, a third spire. To erect a lofty and noble spire on the great central tower would be a triumph of architectural skill and would give a dignity and an elevation to the church which nothing else could impart.

I am sorry that I cannot agree with Canon Owen Davys in thinking that the 14th century builders purposely kept the central tower low, whilst they added spires to the western towers in order to concentrate the whole external effect of the church in the west front. It is quite clear, on the contrary, and abundant evidence to the contrary has turned up in the course of taking down the tower, that the architects of that day endeavoured to rebuild the Norman lantern, but were obliged to desist owing to the unsound condition of the piers. They made two attempts at rebuilding, the one closely following the other. Mr. Davys writes: "The Norman idea was that of a lofty central tower with two smaller western

*I must say frankly, however, that I see no reason why these two pointed arches should be retained if the Norman arcading is restored.

towers, as at Southwell, but the *Early English* builders had since given such unlooked for dignity to the west front that now the Continental idea of western splendour and central lowliness might well be adopted. So two leading thoughts directed the new design; the first to build a tower so light as to avert future danger; the second to build a tower so low as not to divert the eye from the west front. In both these efforts as the towers left the hands of the builders they were eminently successful."—(*Guide to Peterborough Cathedral*, fifth edition, p. 68.)

I quite agree with Mr. Davys as to the first of these reasons for a low tower. I can see no ground whatever for attributing the second to the *Early English* builders. Certainly I know of no view which can be obtained of the west front where a lofty tower or spire would so dominate it as to interfere with its imposing majesty.

The excavations which it was necessary to make at the bases of the piers of the central tower, in order to test the state of their foundations, led to a very interesting discovery. At the foot of the south-eastern pier were found the remains of a Saxon building, doubtless the church of the ancient monastery. This church was destroyed by the Danes when they attacked the monastery in 870. The Abbot John tells us in his Chronicle that when they came to Medeshamstede, the Danes found the inhabitants of the neighbourhood collected beneath the walls of the monastery, which were of such strength that they were obliged to attack them with engines, and cover their approaches with archers. Enraged at the obstinacy of the defence, and especially at the death of his own brother, the Danish leader slew all the monks with his own hand, desecrated the shrines, trampled under foot the relics of the saints, and set fire to the monastery, which was entirely consumed, the fire continuing to rage for fifteen days. And now, after the lapse of a thousand years, the disinterred walls show traces of the action of the fire. The stone tells the story of the destruction. The intense heat to which it has been subjected has changed the colour, and in some portions has left the edges cindery and friable. The walls now exposed to view are of no great thickness, and were probably never of any great height, the upper part of the building having doubtless been of wood. First of all there was laid open to the north of the pier a wall, or rather two walls, with a narrow space between them running east and west. These walls, as has been said, are slight, and the method of their construction and arrangement confirms the supposition that they were intended to carry a wooden superstructure. Beyond these

to the north was evidently open ground, a short wall at right angles to the others coming there to an abrupt termination ; whereas on the south side and west of the pier, at a depth of some six feet below the level of the present Cathedral, the workmen came upon the plaster floor of the ancient building. This was again reached in the south aisle, and extended in all probability to a considerable distance west and south. In the south transept the floor can be followed eastward to a plaster seat placed at the extremity of the building against the external eastern wall. Here it is plain that the limit of the building eastward has been reached, because in the open surface beyond a massive stone sarcophagus is standing, obviously of much more recent date. The lid of this coffin is of uncommon thickness, but at present it is impossible to open it, or, indeed, to examine it carefully, as the huge woodwork on which the steam-cranes are supported rests on the floor above. Indeed, only a portion of the tomb is visible.

How far the remains of this Saxon building extend, and whether the lines of walling indicate the existence of one or more than one building, it is at present impossible to determine. This can only be done when the immense shoring and scaffolding which have been erected for the demolition and reconstruction of the pier have been removed. Unfortunately as the pier stood directly over a portion of the Saxon building it was necessary to destroy some part of it in digging the foundations for the new pier.

If I am right as to this discovery, if we have here come upon the remains of the old Saxon church, then it is quite plain that Mr. Poole is wrong in his conjecture that the Norman church was built on the lines of the old Saxon church. He says, "In substance, I believe, the Abbot John of Sais (who laid the foundation of the existing presbytery, in March, 1117) found the same monastery and especially the same church which Saxulfus had built and Ethelwold restored. Indeed, I suspect that a very large portion of the Saxon church existed until the present nave was built by Abbot Benedict. From that time no visible traces of it remained above ground." And of Waterville, who built the tower and the transepts, he remarks, "His transepts were built in all probability on the foundations of the Saxon transepts, which he removed to make way for them ; but with this difference, that the Saxon transepts had aisles both east and west, the Norman only to the east." And again (p. 203), in reply to Mr. Paley's argument that Waterville must have extended his work west of the central tower because "so large and heavy a tower *could not* have stood safely without some considerable

abutments against the pillars at the west side," and that hence, "two or three nave arches, with their triforia and at least one bay of the clerestory would be essential for sustaining the fabric." "Granted," he says, "if the fabric had not already a sufficient support; but you will remember that we have no reason to doubt that the Saxon nave yet remained, so that the support was there already." All this argument, however, falls to the ground if the building recently disintegrated was any part of the old Saxon church. It could never have been used as an abutment to the Norman towers. In fact, even if the Norman building had followed the same lines, the upper portion of the Saxon church being of wood, nothing but the low stone walls on which this rests would have been left and these calcined by the fire. There was, however, an earlier *Norman* church than the present one, that of Abbot Ernulph. This was burnt down during the abbacy of John de Seez (or Sais), and he it was who built the present choir.

I am able to throw some light upon another question, the probable existence of a crypt under the church. Gunton tells us: "At the south end of the north aisle near the choir is a vault descending into the ground by stairs of stone, and at the bottom a low arched passage going under the church, wherein anyone might go some five or six yards and there find the way stopped with the fall of the earth over head; but how far further this vault went, or to what end it was made, I never could learn. Happily it might lead to some penitential purgatorial place; or, like *Mortimer's Hole*, at *Nottingham*, be a subterraneous passage to some other buildings which are now perished." On this Mr. Paley remarks, "Similar crypts, and in the very same place, exist at *Ripon* and *Hexham*. It was, without doubt, part of the old Saxon church. In 1817, a wall with a subterraneous archway leading towards the church was opened at the base of the mound called *Tout Hill*, on the north side of the church. There may have been a connection between these two singular and mysterious passages."*

Following the direction of Gunton, I have had this vault excavated. It lies just midway between the north-east and north-west piers of the lantern, Gunton meaning by "the south end of the north aisle," the south end of the north transept. It consists of a small entrance chamber and a winding passage trending first from south to north and then

* Mr. Poole is also disposed to look here for the crypt of the Saxon church. See his paper, read at a meeting of the Architectural Societies of the Archdeaconry of Northampton, &c., May 23, 1855.

to north-west and west. Portions of a stone pavement, some three inches thick, remain in a state of excellent preservation. This is at a depth of 5ft. 6in. below the floor of the present church. But it is obvious at a glance that this was no part of the Saxon building. The walls of the passage and of the chamber are of excellent and finished masonry, apparently of Early English date, the chiselling of the surface being finer than the Norman, and being vertical and not diagonal as in the Norman work. The mason's marks upon the stones, a bow and arrow in one place and a triangle in others, are quite plain and distinct. The wall on the south side of the chamber runs in a straight line east and west, and was kept no doubt in a line with, and just behind, the stalls which in the old Benedictine Abbey Churches were carried across the transepts, the screen being placed in the nave, two bays below the central tower. This chamber is 5ft. 9in. by 8ft. 2½in., and has traces of steps both on the eastern and western sides, the latter being somewhat worn and broken away, whilst the edges of the former are still clean and sharp. The passage leading from this chamber goes first at right angles to it, and, after a short distance (some 5ft.), turns sharp at an angle of a little more than 45deg. to the north-west, and then again to the west, and comes to an abrupt termination. Here there are indications of an arch. The passage at the end near the steps is 2ft. 10½in. in width, but becomes narrower after it turns, and at its western extremity is only 1ft. 9½in. in width. The ground beyond this has been excavated for the foundation of the new north-western pier, and it is certain, therefore, that the passage does not extend further in that direction; but just there were discovered two leaden pipes, of 2in. lead, running westward, which, it is conjectured, were used for conveying water from an old well just outside the church. The entrance to this passage was unquestionably by the steps above mentioned. Unless, therefore, the passage was made for access to the pipes, we can only conclude that it was intended to be the approach to some subterranean building, the construction of which was afterwards abandoned, and the unfinished arch at the end of the passage westward may favour this view as well as the other. At the first angle of this zigzag passage, counting from the entrance, there are some indications of another passage to the north-east. The masonry, however, comes almost immediately to an abrupt termination. Otherwise in this direction we might have expected to find the conduit which is said to have brought the water from a well at the foot of Tout Hill to the Cathedral (Paley). The chamber through which the entrance lies, it has

been conjectured, was intended as a place of security for the treasure of the church, but this does not seem to me to be probable. The chamber is somewhat larger than the passage, merely because here was the entrance. The descent to it was by stone steps. On the eastern side there are indications of a complete staircase. On the other side there is no evidence of more than two steps, and these have been partly broken away. It is plain that they originally extended across the recess, and there was doubtless a double flight of steps. On the floor, where the steps are broken away, several fragments of iron were found. These might support the theory of a chest having been kept there for relics, or that of a dungeon or place of penance for refractory monks, suggested by Gunton, were it not so evident that this was only the entrance. A skull and some other human remains were found in this vault, and also several fragments of an ancient stone reredos, the gilding and colouring of which were remarkably fresh and bright when they were first discovered. It must have been a beautiful work of art, either of pointed or early decorated design. Unfortunately no two fragments seem to fit each other, so that it is not easy to restore it even conjecturally.

When speaking of the Saxon building I ought to have mentioned that in the foundation or interior of the eastern piers a few fragments of Saxon moulded work were found, such as perforated slabs of windows, door jambs, and lintels, and one very interesting and richly carved fragment of a capital, almost unquestionably Roman. This may have been brought from Castor, but it is curious that no other fragment of Roman work has been discovered. All these relics of various ages and workmanship have been carefully preserved and will be shown by Mr. Irvine, the Clerk of the Works, to any members of the Union who may wish to inspect them.

NORTHAMPTONSHIRE NATURAL HISTORY SOCIETY & FIELD CLUB.

No 20. November, 1884.

THE BOOK OF NATURE.

A QUIET CORNER.

It was only a country lane. A narrow lane, with a high wild hedge and deep dyke on one side, and a low hedge and bank on the other side. It was a rough road and not much travelled. As one stood at the corner of the lane and looked to the right and left, and making a half-turn looked to the right and left again, there was no human habitation to be seen—there was no voice to be heard. It seemed that all the world had forgotten this little quiet spot.

The deep and cool shade lay on one side and the bright and warm sun on the other. There were crowds of flowers and quite a forest of tall grasses—tall grasses, like minature trees, throwing out their slender branches ; and what beautiful—what perfect shapes ; and what a luxuriant undergrowth of lesser and even more beautiful forms ! Were not the world so full of beauty such a spot would be raised to a shrine, and men would go on a pilgrimage to such a place ; but as it was only one of the trifles that nature has scattered abroad for us, but few think to stop and look at it.

As the soft breeze swept up the lane and the ten thousand fairy branches bent before it, it was like a ripple of laughter passing by. One could not but stop a moment in such a place. It was then I saw that I was not alone, but that I was near to one of the palaces of the insect world.

Some miles away I had passed the great hall, with its lofty towers and gables, surrounded by gardens upon which the hand and skill of man had wrought for generations. It was a grand building, solid, as tho' to defy the ravages of time, for man loves to build as tho' he too were a god, and could produce a work to last for ever ; this is part of man's greatness—a relic of the God-power that he inherits from the Great Father ; but all his works perish as he perishes.

Here was one of the palaces that God has taught his humble creatures to build. It was only a 'spider's web' that the careless footstep might

have shattered, but how beautifully it was made, and how fairly surrounded—in the midst of the great forest of grasses. As kings and rich and mighty men build their houses in the midst of the world's most beautiful landscapes, so, even, the small creatures of God make choice of the most lovely places. All are worshippers of nature. All rejoice in her glory, as all shun her in poverty and barrenness.

Wise men have written of model republics, showing how that men might live together in peace and harmony; but however some men may have desired to live in such a well ordered state of society, there have been others who have made it impossible. Covetous men, brutal men—who have loved war and robbery; but here, in one of the unthought of bye-ways of the world, hidden in the wild growth of the road-side luxuriance, was a community living in peace, all working, all honoured, all enjoying—that the great ones of the human race, those who are but a little less than the angels—might have copied. It was a colony, a state, a kingdom, or whatever one might wish to call it of those despised little creatures the spiders. I have heard people despise many of God's creatures, while they have not been living such well ordered lives as the dumb creatures they, in their great pride, scorned to think about. But how temperate, and careful, and submissive to the laws of nature are these; but how defiantly, how wilfully man outrages them. Surely we may consider the humble creatures of the world and not despise their teachings.

It might be a village or town of the little race, but whichever it was, it was built with wondrous skill. It was full of life and there was no discord. Everywhere was a palace of silken threads—and if all were subjects, all were kings.

There were hundreds of tiny creatures no bigger than the head of a pin wandering about in their houses and the gardens that surrounded them. It might have been a 'fair' or some great 'holiday' of the small inhabitants, for there was a fullness of life and a joyous going hither and thither, and a continual greeting, indicating a time of rejoicing in the community; but you will say it was only a mass of spiders' web that a stroke of the hand might destroy. Surely it was so. But Babylon, and Memphis, and Edom, the mightiest cities that man has built, have been swept away by the hand of time.

Looking upon the light-hearted company I did not think of time—the enemy that pursues us all. I only thought of the beautiful city of silken threads that spread out beneath my eyes, and the multitude of joyous creatures that made merry in the sunlight.

There did not seem to be much order in the planning of the city. It did not look much different to the map of any of our great towns. In the places where men make their dwellings, there is the strange labyrinth of

streets, and here was the same labyrinth of silken roads. In our cities there are the busy passers to and fro, and here was the same busy crowd ; but there were no squalid quarters here, every street was a line of finely woven web. There were no courts and slums as in our human cities.

It seemed like a peep into another world to look upon that multitude of life. This, however, was not all that was to be seen in this quiet place, for not two feet from the little city was the remains of an old wall, and here multitudes of bees had made their home, and were busy bringing in their winter stores. Bright little creatures that never rested a moment from their labour. Besides, there were troops of gaily-dressed flies that, when resting for a moment from their gambols on some tall swinging grass frond, seemed so fragile, that they could not live thro' the storms of a summer's day. Their bodies so slender, their wings so fine and glossy—so delicately tinged with rich and beautiful colours—that when sporting in the sunbeams they were but as so many fragments of thistle-down. Then there were crowds of other gaily painted creatures, all so bright and active, hurrying to and fro in as strange a manner, and as regardless of each other, as do the crowds of human beings in the streets of our towns. The forest of grasses was crowded with the countless busy life—atomies, working with all the diligence of the most important of the human race.

I had walked up this lane a few months earlier, while yet the reign of winter was over all. Then the little spot of earth was bleak and bare. There were no flowers, and the tall grasses lay level with the earth as tho' a hurricane had swept over the place. There was no sign of life. No living thing was to be seen. All the insects were hidden away in the earth, secreted in the crevices of the bark of the trees, or the cavities of the broken wall—then it was a city of the dead. To-day it was a marvellous resurrection—a fullness and intensity of life, with thousands of busy creatures working while yet the day was bright and the warm sun lighting up the world. These hardy little creatures, working away so earnestly, climbing over hill and down vale, seemed intent only upon preparing for the long cold months, when they could not live if they came into the world where the frost and the keen wind swept the earth. But what of those gossamer-winged trifles that perished by myriads ? How was this race perpetuated ? Could they hide away, or where could they deposit their eggs, that biding the winter's cold, were hatched by the returning summer's sun and gave forth crowds of life ?

Some men grow frightened at the multitude of the human race, and are fearful that some day the earth may fail to give food to eat and raiment to wear ; but the earth has never failed any creature that God has placed upon it. If fear for supply of food could have entered into these tens of thousands of creatures that hurried about in these few yards, what anxious unhappy

lives they must have lived. But there was no sign of distrust; all was labour and enjoyment—from the crowded inhabitants of the city that were ever passing to and fro up the labyrinth of glossy streets, or swinging from the topmost branches of the minature trees, to the gnat sporting its few days in the sun, and the countless insects with which this spot of earth was crowded.

I was carefully watching one of the patient little creatures as with a morsel of food it pushed its way thro' the tangled road it was following—as a man might make his way thro' the thickest part of a forest—climbing, and descending, and burrowing under some heavier mass, then re-appearing, always pushing on to its winter store-house, when a rustling in the branches of the elm close by caused me to look up, and there stretching around in every direction was the great world that I had for a time forgotten while looking upon this little quiet spot. I thought can all the great world be so full of life! I had never before thought of this immensity of life by which we are surrounded, for if this little spot is so full of such wonderfully beautiful little creatures in such countless numbers, and the whole world is as this place, what a marvellous world is ours, and how little we know of it—of the grasses that clothe it, the flowers that adorn it, and the life that is in and all about it.

W. BARTON, Preston Deanery.

ARAUCARIA IMBRICATA FLOWERING AT NORTHAMPTON.

It is worth noting that an araucaria in the Cemetery has been in flower this year. This is a very unusual occurrence, at least so far north, and it is worthy of remark that another plant at Houghton (Hunts) has also flowered this year, which it has never done before. I believe they occasionally flower in the south-west of this country, but I have never heard of their doing so in the Midland Counties before. Is it possible that it may have been caused by the succession of mild winters that we have had?

The plant is a dioecious one, therefore no cones were formed; I believe it was the staminiferous form which flowered.

H. N. DIXON.

THE FOLLOWING LIST OF BOOKS

Relating to Botany and Geology, which are in our own Library and the Free and Reference Libraries, has been drawn up with the idea that it might be of use to the students of those subjects. This catalogue is not intended to be a complete list of the Botanical and Geological works in the several libraries, but only of those which are likely to be of service to our Geologists and Botanists; and as there is no reliable catalogue of the town library, some works may have escaped notice.

The following abbreviations are used:—Ref. Lib. for books in the Reference Library; T. Lib. for the circulating department of the Town Library; Nat. Hist. for those which belong to the Natural History Society; N. D. No Date.

BOTANY.

Berkeley (M. J.)	Outlines of British Fungology	...	1830.	Ref. Lib.
—————	Handbook of British Mosses	...	1883.	Ref. Lib.
Braithwaite (R.)	British Moss Flora—Not yet completed			
Curtis'	Practical Observations on the British Grasses	...	1824.	T. Lib.
———	Botanical Magazine, continued by J. Sims, containing many coloured plates—Vols. I.—XLIX.		1793—1822.	Ref. Lib.
———	Botanical Magazine, conducted by S. Curtis, the descriptions by Sir William J. Hooker, Vols. I.—XI. of new series, with index	...	1827—37.	Ref. Lib.
Darwin Chas.	Insectivorous Plants	...	1876.	Ref. Lib.
—————	The Effects of Cross and Self-fertilisation of Plants	...	1878.	Ref. Lib.
—————	The Formation of Vegetable Mould through the action of Earth Worms	...	1883.	Ref. Lib.
—————	The Movements and Habits of Climbing Plants	...	1882.	Ref. Lib.
—————	The different forms of Flowers	...	1884.	Ref. Lib.
—————	The power of Movement in Plants	...	1882.	Ref. Lib.
—————	The various contrivances by which Orchids are fertilised by Insects—2nd ed.	...	1882.	Ref. Lib.
—————	The variation of Animals and Plants under Domestication—2nd ed.	2 vols.	1882.	Ref. Lib.
Druce (G. C.)	Notes on the Flora of Northamptonshire.			Nat. Hist.
Evelyn (J.)	Sylva, or a Discourse of Forest Trees—2 vols.		1825.	Ref. Lib.
Francis (G. W.)	An Analysis of British Ferns and their Allies	...	1842.	Nat. Hist.
Gerarde (J.)	The Herball or Generall Historie of Plantes		1636.	T. Lib.
Henslow (J. S.)	Descriptive and Physiological Botany	...	1835.	T. Lib.

Hooker (Sir W. J.)	British Ferns	...	...	1861.	Ref. Lib.
	"	...	...	1861.	Nat. Hist.
Hull (J.)	British Flora	...	...	1799.	T. Lib.
Johns (C. A.)	Flowers of the Field	...	...	N. D.	Nat. Hist.
Journal of Botany	...	...	...	1876-84.	Nat. Hist.
Lankaster (Mrs.)	Wild Flowers worth notice	...	...	1879.	T. Lib.
London Catalogue of British Plants	...	...	...	1871.	Nat. Hist.
London Catalogue of British Mosses	..	...	...	1877.	Nat. Hist.
Lowe (E. J.)	Our Native Ferns	...	...	1865.	Nat. Hist.
Miller (Phillip).	Figures of Beautiful, Useful, and Un- common Plants	...	...	N. D.	Ref. Lib.
Phillips (H.)	Pomarium Britannicum	...	...	1822.	Ref. Lib.
Phillips (G.)	Flora Historica—2 vols.	...	...	1824.	Ref. Lib.
Pratt (Anne).	Haunts of the Wild Flowers	...	...	1863.	T. Lib.
—————	Flowers and their Associations..	...	...	N. D.	T. Lib.
—————	Field, Garden, Woodland Flowers and Plants in General	...	...	1847.	T. Lib.
Relhan (R.)	Flora Cantabrigiensis	...	...	1785.	T. Lib.
Robinson (W.)	Alpine Flowers for English Gardens— 3rd ed.	...	...	1879.	T. Lib.
Ralph.	Icones Carpologicæ	...	...		Nat. Hist.
Sachs (Julius).	Text Book of Botany—2nd ed...	...	...	1882.	Ref. Lib.
Smith (Gerard).	The Ferns of Derbyshire	...	...	1877.	Nat. Hist.
Smith (J. E.)	Introduction to Botany	...	...	1809.	T. Lib.
Sowerby's English Botany, or Coloured Figures of British Plants, by James E. Smith, the Figures by James Sowerby—vols. 2 to 18—17 vols.	...	...	...	1793-1803.	Ref. Lib.
—————	English Botany, by Sir James E. Smith—3rd ed. 6 vols.	...	...	1849.	Nat. Hist.
—————	Coloured Figures of English Fungi—3 vols.	...	...	1797-1803.	Ref. Lib.
Strutt (J. G.)	Sylva Britannica, or Portraits of Forest Trees distinguished for their Antiquity, Magnitude, and Beauty	...	...	1826.	Ref. Lib.
Thornton (Robt. J.)	The British Flora—5 vols.	..	...	1812.	Ref. Lib.
Warner (R.)	Plantæ Woodfordensis	...	...	1771.	Nat. Hist.
Watson (H. C.)	Geography of British Plants	...	...	1835.	Nat. Hist.

GEOLOGY.

Bakewell (Robt.)	An Introduction to Geology	...	1828.	Nat. Hist.
Baily (W. H.)	Figures of Characteristic British Fossils— Vol. I. Palæozoic	...	1875.	Nat. Hist.
Bonney (T. J.)	Geology of Cambridgeshire	...	N. D.	Nat. Hist.
Boyd Dawkins (W.)	Cave Hunting	...	1874.	Ref. Lib.
—————	Early Man in Britain	...	1880.	Ref. Lib.

Buckland (W.)	Geology and Mineralogy, Bridgewater Treatise—2 vols.	1836.	T. Lib.
Croll (James).	Climate and Time in their Geological Relations	N. D.	Ref. Lib.
Damon (R.)	Geology of Weymouth, with Supplement...	1860.	Nat. Hist.
Darwin (Chas.)	The Descent of Man... ..	1883.	Ref. Lib.
—————	The Origin of Species	1884.	Ref. Lib.
—————	Geological Observations—2nd ed.	1876.	Ref. Lib.
De-la-Bèche (H.)	How to Observe Geology	1835.	T. Lib.
—————	The Geological Observer	1851.	T. Lib.
Dixon (F.)	Geology and Fossils of the Tertiary and Cretaceous Formations of Sussex	1850.	Nat. Hist.
Evans (J.)	The Ancient Stone Implements of Great Britain	1872.	Ref. Lib.
Geikie (A.)	Prehistoric Europe	1881.	Ref. Lib.
—————	The Great Ice-age—2nd ed.	1877.	Ref. Lib.
—————	Text Book of Geology	1882.	Ref. Lib.
Geological Magazine—14 vols.	1866-70 and 1876-84.		Nat. Hist.
Geologist	... ..	1862.	Nat. Hist.
Green (A.)	Geology for Students	N. D.	Nat. Hist.
Hack (Miss).	Geological Sketches	N. D.	T. Lib.
Judd (J. W.)	The Geology of Rutland, and parts of Lincolnshire, Northamptonshire, Huntingdonshire, and Cambridgeshire	1875.	Nat. Hist.
Jukes (J. Beete).	The Students' Manual of Geology—3rd ed., by A. Geikie	1872.	Nat. Hist.
—————	The School Manual of Geology—3rd ed.	1876.	Nat. Hist.
Jobert.	Philosophy of Geology	1846.	Nat. Hist.
Jones (Rupert).	A Catalogue of the Fossil Foraminifera in the British Museum	1882.	Nat. Hist.
Knipe's	Geological Atlas of the British Isles		Ref. Lib. Nat. Hist.
Lardner's	Popular Geology	1856.	Nat. Hist.
Lubbock (Sir John).	Prehistoric Times—4th ed.	1878.	Ref. Lib.
Lycett (J.)	Geology of the Coteswold Hills	1857.	Nat. Hist.
Lyell (Chas.)	Principles of Geology—4 vols. 4th ed.	1835.	T. Lib.
—————	Elements of Geology—6th ed.	1865.	T. Lib.
—————	Evidences of the Antiquity of Man	1863.	Nat. Hist.
Mackie.	First Traces of Life	1860.	Nat. Hist.
Mantell (G. A.)	Wonders of Geology—2 vols	1840.	T. Lib.
—————	Medals of Creation—2 vols.	1884.	Nat. Hist.
—————	Geological Excursions round the Isle of Wight	1854.	Nat. Hist.
—————	Gallery of the Organic Remains in the British Museum	1851.	Nat. Hist.
Mello.	The Geology of Derbyshire	N. D.	Nat. Hist.

Miller (Hugh).	Testimony of the Rocks	...	...	1857.	T. Lib.
—————	Cruise of the Betsy	...	...	1858.	T. Lib.
Molloy (G.)	Geology and Revelation...	...	..	1872.	Nat. Hist.
Morris (John).	A Catalogue of British Fossils—2nd ed..	...	...	1854.	Nat. Hist.
Murchison (R. I.)	Siluria, a History of the Oldest Rocks in the British Isles—5th ed.	...	...	1872.	Nat. Hist.
Nicholson (H. A.)	The Ancient Life-history of the Earth	...	...	1877.	Ref. Lib.
—————	A Manual of Palæontology—2nd ed.	...	...	...	...
	2 vols.	...	...	1879.	Ref. Lib.
Owen (Rich.)	A History of British Fossils, Mammals, and Birds...	...	...	1846.	Ref. Lib.
Page (D.)	Text-book of Geology	...	...	1877.	Nat. Hist.
—————	Advanced Text-book of Geology	...	...	...	Nat. Hist.
—————	Chips and Chapters	...	...	...	Nat. Hist.
Palæontographical Society's Publications, from the commencement in 1847, up to present date				1847-84.	Nat. Hist.
Phillips (John).	Figures and Descriptions of the Palæozoic Fossils of Cornwall, Devon, and West Somerset	...	...	1841.	Nat. Hist.
—————	Life, its Origin and Succession	...	...	1860.	Nat. Hist.
Porter.	Geology of Peterborough	...	...	Ref. Lib.	Nat. Hist.
Ramsay (A. C.)	The Physical Geology and Geography of Great Britain	...	...	1878.	Nat. Hist.
Roemer (F. A.)	Versteinerungen der Nord-deutschen Oolithen-Gebirges	...	...	1836.	T. Lib.
Sharp (Samuel).	Rudiments of Geology—1st and 2nd editions	...	...	1875.	Nat. Hist.
—————	Sketch of the Geology of Northamptonshire	...	...	1874.	Nat. Hist.
Symonds (W. S.)	Records of the Rocks, or Notes on the Geology, Natural History, and Antiquities of North and South Wales, Devon, and Cornwall	...	...	1872.	Nat. Hist.
—————	Old Bones	...	...	N. D.	Nat. Hist.
Taylor (John).	Geological Essays	...	...	1864.	Nat. Hist.
Taylor (J. E.)	Geological stories	...	...	...	Nat. Hist.
	Vestiges of the Natural History of Creation—4th ed.	...	...	1845.	T. Lib.
Woods (J. E.)	Geological Observations in South Australia	...	...	1862.	T. Lib.
Woodward (H.)	A Catalogue of British Fossil Crustacea	...	...	...	Nat. Hist.
Woodward.	A Manual of Mollusca, Recent and Fossil..	...	...	...	Nat. Hist.

THE FLORA OF NORTHAMPTONSHIRE.

(Continued.)

BY G. C. DRUCE, F.L.S.

PRIMULACEÆ, Vent.

Hottonia palustris, L. Water Violet. Native. Slow streams, ditches, and fen dykes. Local. Confined to the eastern portion of the county. May—July. Top. Bot., p. 332.

First record—Between Peterboro' and Thorpe, Gough's Camden, 1695.

Millefolium aquaticum dictum viola aquatica, J. B.

Nene a, a variety with red flowers at Kelmarsh (Mr. Rudge), in Baxt. Br. Plants and New Botanists' Guide. Nene c, in fen ditches about Sir John Shaw's decoy (Morton's History), Peterboro' (Paley), between Tansor and Cotterstock, North Bank Dyke, Boro' Fen, Thorpe, Eye, etc.

1037. *Primula vulgaris*, Hudson. Primrose. Native. Woods and hedge banks; generally common, but scarce round Northampton. March—July.

First record—Notcutt, 1845, Daventry.

Cherwell, Chacombe (French), Helmdon, Aynhoe; Avon, Barby (H. W. Trott), Elkington; Ouse, Whittlewood Forest, Furtho', Moorend, Silverstone, etc.; Nene a, Hazlebeech, Salcey Forest, Plain Woods, etc.; Nene b, Yardley Chase, Overstone (Mrs. Birch), etc.; Nene c, Bedford Purlieus, Wakerley Woods, etc.; Welland, Rockingham, Sibbertoft, etc.

The caulescent form Mr. French saw in Whistley Wood, Mr. Trott at Barby, and the Author in Whittlebury Forest. The hybrid vulgaris-officinalis, the Oxlip, in Whittlebury Forest, Plain Woods, Salcey, Overstone, Denton Wood, Yardley Chase (Rogers), is not unfrequent; although locally called Oxlip this is not the true plant of that name, which is Jacquin's *P. elatior*, and is found in meadows in Essex, Cambridge, and Suffolk; it may be known by its nodding flowers and the absence of folds about the entrance to the corolla tube; it also has lanceolate teeth to the calyx.

The Primrose has been a great favourite of the poets. John Clare, the Northamptonshire poet, has written :—

“How sweet thy modest unaffected pride

Glows on the sunny bank and wood's warm side !

And where thy fairy flowers in groups are found,

The school-boy roams enchantedly along,
 Plucking the fairest with a rude delight ;
 While the meek shepherd stops his simple song
 To gaze a moment on the pleasing sight,
 O'erjoyed to see the flowers that truly bring
 The welcome news of sweet returning spring."

Tennyson, in "In Memoriam," says :—

"Ah, take the imperfect gift I bring
 Knowing the primrose yet is dear,
 The primrose of the later year,
 As not unlike to that of spring."

"Pale primroses
 That die unmourned ere they can behold
 Bold Phœbus in his strength."—*Winter's Tale*.

"Bring the rathe primrose that forsaken dies
 * * * *

And every flower that sad embroidery wears."—*Lycidas*.

The Oxlip was a great favourite of Cowley ; he says :—

"The next that took her place were oxlips. The primrose and the cowslips too were there, both of each kin but no so handsome far."

The dimorphism of the Primrose is very peculiar, and Mr. Darwin's investigations into the subject are of great interest and importance.

1038. *Primula officinalis*, Linn. Cowslip. *P. veris*, Hudson. Native. Dry pastures and banks in woods. Generally distributed on calcareous soil throughout the county.

First record—Notcutt, 1845, Drayton.

Cherwell, Aynhoe ; Avon, Drayton (Notcutt), Yelvertoft ; Ouse, Roade, Coppice Moor, Plum Park, etc ; Nene a, Cottesbrooke, Preston Wood, Badby, Gayton, Litchboro', etc. ; Nene b, Cogenhoe, Higham Ferrers, Overstone (Mrs. Birch), Woodford, etc. ; Nene c, Caistor, Bedford Purlieus, etc. ; Welland, Rockingham, Stamford, Barnack.

The Cowslip, next to the daisy and buttercups, is perhaps the best known flower to our country children, and the Midland poets have immortalized it in verse.

Shakespeare considers it a fitting house for the fairy queen.

"The cowslips tall her pensioners be,
 In their gold coats spots you see ;
 Those be rubies, fairy favours,
 In those freckles live their savours.
 I must go seek some dew-drops here,
 And hang a pearl in every cowslip's ear."

1045. *Lysimachia vulgaris*, L. Yellow Loose Strife. Sides of ditches and ponds. Native. Local. July—August.

First record—Morton's History, 1712. "*Lysimachia*, with three leaves in each whorl, upon the Nyne banks."

Cherwell, side of river south of Banbury (T. Beesley); Ouse, Cosgrove near Canal—see Report of Record Club, 1877. Top. Bot., p. 336. Nene b, Denford (Lewin); Nene c, Kingscliffe (W. Pitt, 1797), Peterboro' (Paley).

1047. *Lysimachia nummularia*, L. Money Wort. Creeping Jenny. Native. Stream sides, meadows, and wet woods. Generally distributed. June—August.

First record—Baker's History, Great Billing, 1822.

Cherwell, river side (French), Aynhoe; Avon, Drayton Reservoir (Notcutt); Ouse, Tove banks, Whittlebury Forest, Wappenham (Miss Scott), Cosgrove, etc.; Nene a, Harleston, Dallington, Blisworth, etc.; Nene b, Great Billing (Miss Baker), Castle Ashby (Rogers), Delapre, Irthlingboro', etc.; Nene c, Wansford (W. H. Jones), Marholm, Peterboro', Boro' Fen, etc.; Welland, Helpstone, etc.

1048. *Lysimachia nemorum*, L. Yellow Pimpernel. Native. Woods and heathy places. Local. May—August.

First record—*Anagallis lutea*, Ger. "In a moist grove on the north side of Pytchley" (Morton), 1712.

Ouse, Wappenham Wood (Miss Scott); Nene a, Daventry Woods (Notcutt), Badby Wood, 1876; Nene b, Pytchley (Morton); Welland, Wakerley Wood (W. H. Jones).

1849. *Anagallis arvensis*, L. Shepherd's Weather Glass. Native. Cultivated fields. Generally distributed. May—December.

First record—Baker's History, Boughton, 1822.

Cherwell, Warkworth (French), Kingsutton; Avon, Yelvertoft, etc., Braunston road (Notcutt); Ouse, Yardley Gobion, Stoke Bruerne, etc.; Nene a, Boro' Hill (Notcutt), Boughton (Baker), Harleston, Brixworth, Moulton Park, Harrington, Upton, Rothersthorpe, etc.; Nene b, Overstone (Mrs. Birch), Denton, etc.; Nene c, Warkton, Thornhaugh, Southorpe, Fotheringhay; Welland, Ufford, Helpstone, etc.

With flesh-coloured flowers at Yardley Gobion and at Barnack.

"The pimpernel, whose brilliant flower
Closes against the approaching shower,
Warning the swains to sheltering bower
From humid air secure."

Lord Bacon, who refers to this plant as the Wincopipe, quotes the opinion of the country people alluded to in the above verse, and also says "they believe that if its flowers open in the morning a fair day is sure to follow."

“ Such is the science to the peasant dear,
Which guides his labour through the varied year ;
While he, ambitious 'mid his brother swains
To shine, the pride and wonder of the plains,
Can in the pimpernel's red-tinted flowers,
As close their petals, read the measured hours.—*Leyden*.

I cannot say that my experience shows that much reliance can be placed upon the flower as a barometer ; there is no doubt that it closes in rainy weather, but not sufficiently long before rain commences to be of much service.

1050. *Anagallis cærulea*, Schreb. Native. Cultivated fields. Local and rare.

First record—Parkinson's *Theatrum Botanicum*, 1640.

Ouse, Cottesford Heath (Beesley)—this may be in Oxfordshire ; Wapenham (Miss Scott), Coppice Moor, and Potterspury ; Nene b, Raunds, Higham Ferrers and Irchester (Parkinson's *Theat.*), Castle Ashby, one specimen (Rogers) ; Nene c, Bedford Purlieu (W. H. Jones) ; Welland, Fineshade (Lewin).

1051. *Anagallis tenella*, L. Bog Pimpernel. Native. Boggy places. Very rare. July—August.

First record—Morton's *History*, 1712. *Nummularia minor* flore purpurascente, Ger.

Nene a, Harleston Heath (Morton's *Hist.*), Foxhall (Lewin) ; Nene c, Kingscliffe, Wansford (Rev. M. J. Berkeley), Southorpe.

1054. *Samolus Valerandi*, L. Water Pimpernel. Native. Stream sides. Local and rare. June—August.

First record—Paley, 1860. Near Marholm Wood.

Nene a, Nene banks above Northampton, growing with and almost hidden by *Myosotis palustris* ; Nene b, Wellingboro' (T. B. Blow)—see Rep. of Rec. Club, Top. Botany, p. 339 ; Great Billing Mill (Rogers), Denford, and Thrapstone ; Nene c, Eye (Paley), Thorpe, Wittering ; Welland, Marholm Wood (Paley), Blatherwycke (Lewin), banks of Welland and Easton Brook sides (W. H. Jones).

PLANTAGINEÆ, Vent.

1061. *Plantago major*, L. Great Plantain. Way-bred. Native. Meadows, way sides. Very common. Top. Bot. 341.

First record—Wm. Pitt, 1787.

Cherwell, Banbury (French), Charwelton, etc. ; Avon, Barby (H. W. Trott), Elkington ; Ouse, Stoke Bruerne, Yardley Gobion ; Nene a, Brampton, Harleston, Spratton, Badby (Notcutt), Ashby St. Ledgers, etc. ; Nene b, Meadows below Northampton (W. Pitt), Abington, Geddington, etc. ; Nene c, Peterboro' (Paley), Barnack ; Welland, Easton-on-Hill, etc.

Mr. French noticed a variety with paniced inflorescence between Buston and Kingsutton, and I have seen the same near Kingsthorpe; this and other forms are described in Maxwell T. Masters' *Vegetable Teratology*.

1062. *Plantago media*, L. Hoary Plantain. Lamb's Tongue. Native. Meadows, road sides, etc., on calcareous soil. May—September.

First record—Paley, 1860.

Cherwell, Banbury (French); Avon, Barby (Trott); Ouse, Moorend, Coppice Moor, Grafton, Cosgrove, etc.; Nene a, Horton, Blisworth, Norton, Road; Nene b, Ecton, Easton Maudit (Miss Brent), Kettering (Lewin), Brafield, Denton (Rogers); Nene c, Peterboro' (Paley), Wittering, etc.; Welland, Stamford, Easton, Collyweston.

1063. *Plantago lanceolata*, L. Ribgrass. Ribwort. Native pastures, cultivated ground. Abundant in every district. June—August.

P. Timbali, Jord. Clover fields, Yardley Gobion.

“And plantain ribbed that heals the reaper's wound.”

The name Way-bred, or more properly Way-broad, was given to it on account of its universal occurrence. In Germany it is called *Wegetritt*, in Sweden *Wagbredblad* Plantain, while the Indians of North America call it Whiteman's-foot.

“Wheresoe'er they move, before them
Swarms the stinging fly, the Ahmo,
Swarms the bee, the honey maker;
Wheresoe'er they tread—beneath them
Springs a flower unknown amongst us—
Springs the whiteman's-foot in blossom.”—Hiawatha.

An address to it in a book of recipes of the eleventh century, by Alfrie, alludes to its virtues and powers—

“And thou, way-broad!
Mother of worts,
Open from eastward,
Mighty within;
Over thee carts creaked,
Over thee Queens rode,
Over thee brides bridalled,
Over thee bulls breathed;
All these thou withstood'st,
Venom and vile things
And all the loathly ones
That through the land rove.”

1064. *Plantago Coronopus*, L. Buck's-horn Plantain. Native. Rare. Possibly extinct.

First and only record—Baker's History, 1822, Great Billing.

The sandy soil about the Lings would appear to be the most likely place for it, but I have repeatedly searched unsuccessfully.

Plantagoarenaria.

A casual at Grimsbury (A. French, 1868.)

CHENOPODIACEÆ, Br.

1074. *Chenopodium olidum*, Curt. *C. vulvaria*, L. Stinking Goose-foot. Waste places. Rare.

First record—Morton's History, 1712. "In road nigh St. Sepulchre's Church-yard it is sufficiently common."

It has disappeared from the above locality, but was not unfrequent about the refuse heaps of the Sewage Works. The horrid smell of this plant is probably due to trimethylamine, which in odour is somewhat like stale fish.

1073. *Chenopodium polyspermum*, L. Denizen—Waste ground. Local and rare.

First record—H. C. Watson, 1873.

Cherwell, Grimsbury (French); Nene a, Newnham; Nene c, Peterboro' (H. C. Watson), Top. Bot., ed. i.; Welland, Fineshade (Lewin).

1075. *Chenopodium album*, L. Goosefoot. Native. Cultivated ground and waste places. Abundant in all the districts.

Var. *a. candicans*, Lam., is generally distributed in cornfields throughout the county.

Var. *b. viride*, L. In cultivated fields, gardens, and on waste ground. Generally distributed.

Var. *c. paganum*, Reich. Manure heaps, turnip fields, etc. Not uncommon throughout the county.

Var. *a* is a fairly distinct variety, but *b* and *c* seem to be so closely allied as to be impossible at all times to differentiate.

1078. *Chenopodium hybridum*, L. Maple-leaved Goose-foot. Waste places, river side. Local and rare.

First record—Rev. M. J. Berkeley. Cybele Brit. 1854. Top. Bot.

Cherwell, near Grimsbury (French); Nene a, Northampton Sewage Works, Midsummer Meadow, etc.; Nene b, Wood Newton (Lewin).

Not unfrequent around Northampton, although usually rare in England.

1079. *Chenopodium urbicum*, L. Upright Goose-foot.

First record—Paley, 1860.

Nene b, Kettering (Lewin), Great Easton (Miss Brent); Nene c, Peterboro' (Paley).

I very much doubt if the above records belong to *C. urbicum*. *C. rubrum* was probably the plant seen in each case.

1080. *Chenopodium rubrum*, L. Red Goose-foot. Waste places. Native. Local.

First record—Notcutt, 1845, Drayton Reservoir.

Cherwell, Grimsbury (French); Avon, Drayton Reservoir (Notcutt); Nene a, Wootton, Upton, Ashby road (Notcutt); Nene b, Sewage Works, abundant, Chadstone (Rogers); Nene c, Peterboro' (Paley).

I expect this is the plant recorded in Morton's History as "Blitum erectum, J. B., on the inside of the banks of the Ise, betwixt Clipstone and Kelmarsh Lane in great plenty."

1083. *Chenopodium Bonus Henricus*. Good King Henry. Fat Hen. Wild Spinach. Denizen. Waste ground, road sides, near villages, etc. Generally distributed.

First record—Paley, 1860.

Cherwell, not uncommon near villages about Banbury (T. Beesley); Avon, Yelvertoft; Nene a, Dallington, St. James' End, Duston, Quinton, Newnham; Nene b, Chadstone, Castle Ashby (Rogers), Houghton, Delapre, Weekly, etc.; Nene c, Peterboro' (Paley).

Probably not a native, but from its frequent use in former times for culinary purposes, the plant is now not unfrequent in the county, but generally in the vicinity of villages.

1085. *Atriplex angustifolia*, Sm. Narrow-leaved Orache. *A. patula*, L. Native. Waste and cultivated ground. Abundant throughout the county.

1086. *Atriplex deltoidea*, Bab. Native. Waste ground, stream sides, etc.

First record—Paley, 1860.

Cherwell, Middleton road, Warkworth (French), Var. *microsperma*, Overstone (French), Kingsutton; Nene a, Harpole, Duston; Nene b, Sewage Works, Vigo, Great Billing; Nene c, Peterboro' (Paley), Boro' Fen.

1088. *Atriplex Smithii*, Syme. *A. hastata*, Bab. *A. calotheca*, Rafn. ? Native. Cultivated ground.

First record—The Author, 1876.

Nene a, Duston, Upton, etc.; Nene b, Sewage Works, etc.; Nene c, near Peterboro'.

1086. *Atriplex erecta*, Hudson. Native. Cultivated fields. Not uncommon.

First record—The Author, 1878.

Not uncommon in cultivated fields throughout the county.

Blitum virgatum, L.

Occurred on the church-yard wall at Church Brampton, in 1875.

METEOROLOGICAL REPORT AND OBSERVATIONS.

JULY.

THE first few days of July were fine and hot, culminating in a very severe thunderstorm on the 4th; although lasting less than an hour it did an immense amount of damage, several houses and other buildings in the town being struck by the lightning, whilst in the country district a great many horses, etc., were killed and injured. Another thunderstorm occurred on the 9th, when the rainfall was excessively heavy and variable, three-quarters-of-an-inch falling in two hours at the west end of the town, and nearly one-and-a-quarter-inches at the east end. The remainder of the month was fine and warm, with a few slight showers. The mean temperature, 63°, was rather above the average, the maximum registered varying from 88° on the 4th, to 65° on the 25th and 26th; the minimum varied from 42° on the 26th to 60° on the 9th. The rainfall was heavy, registering 3·24 ins., or 0·30 in. above the average of the last 15 years. The barometer varied very slightly from 29·50 ins. on the 10th and 16th, to 30·00 ins. on the 1st and 30th.

AUGUST.

A spell of real summer weather prevailed throughout the month, and higher temperatures were registered than any previously observed this season. The mean temperature for the month, 64°, was 3° above the average, the maximum registered being 87° on the 11th, the minimum 43° on the 26th. The rainfall, 1·84 in., was low, being 0·26 in. below the average of the last 15 years. The barometer varied from 30·10 ins. on the 5th to 29·45 ins. on the 28th.

SEPTEMBER.

The fine weather which prevailed during August has continued with but little interruption, and we have again to chronicle a month with exceptionally high temperatures, and with a mean more in excess of the average than any of the preceding summer months. The other meteorological conditions were also those common to fine weather. The amount of rain was very small, 1·19 in. only falling, or 1·82 in. below the average of the last 15 years. The mean temperature, 59°, was high, being about 3° above the average; the maximum registered was 78° on the 17th; the minimum 30° on the 30th. The barometer varied from 29·20 ins. on the 7th to 30·20 ins. on the 12th and 13th.

F. LAW.

METEOROLOGICAL REPORT AND OBSERVATIONS.

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JULY, 1884.

STATION.	OBSERVER.	RAINFALL.					SHADE TEMPERATURE.			
		Total for Month.	Total for Year.	Greatest Fall.	Wet Days.		Maximum.		Minimum.	
							Deg.	Date.	Deg.	Date.
Northampton ..	H. Terry	8.75	10.92	1.04	9	16	76	4	45	25
"	F. Law	8.27	10.15	0.75	9	18	88	4	42	26
Castle Ashby ..	R. G. Scriven	8.82	12.02	0.90	10	20	83	3 & 4	41	25
Litchborough ..	Ed. Grant	2.14	12.28	0.40	24	22	87	4	41	25
Sedgebrook	C. Markham	3.51	11.06	0.70	9	20	85	4	41	26
Rothwell	J. More, M.D.	2.21	8.40	0.65	10	14	..	..	..	..
Oundle	S. P. Holloway	2.66	9.20	0.59	9	19	..	..	..	..
Towcester	J. Webb	1.93	10.84	0.27	10	18	..	..	..	..
Little Houghton ..	J. Brawn	2.85	11.07	0.63	24	19	66	4	42	19
Fawsley	Lady Knightley	2.26	11.14	0.37	23	17	78	4	44	25
Thorpe Manville ..	Seth Barnes	2.17	12.02	0.48	15	19	..	..	..	..
Floore	E. G. Loder	2.05	..	0.28	11	16	83	5	41	26
Twynwell Rectory ..	Rev. H. Waller	3.23	..	0.59	9	19	..	..	..	..
Whittlebury	W. S. Miller	2.15	12.12	0.31	6	17	82	4	35	28
Hazelbeach	Mrs. Albert Pell	3.50	..	0.50	10	18	80	5	50	20, 21, 24
Rockingham Castl.	H. Wate	3.51	12.51	1.06	10	12	..	..	..	..
Holdenby	J. Gregory	4.79	14.39	1.10	9	23	..	..	..	..
Kettering	C. W. Lane	3.26	11.30	0.86	10	18	86	4	44	28
Peterborough	J. Whitwell	8.16	9.77	0.71	10	18	57	4	80	5
Average 18 years 1866-83 ..	H. Terry	2.82	4.12	..	..	..	..	..	..	..

AUGUST.

Northampton ..	H. Terry	1.80	12.72	0.78	31	7	75	8 & 9	45	25
"	F. Law	1.84	11.96	0.76	31	10	77	11	43	26
Castle Ashby ..	R. G. Scriven	1.81	13.83	0.85	31	9	92	8	41	25
Litchborough ..	Ed. Grant	2.17	14.45	1.02	31	10	94	8	42	25
Sedgebrook	C. Markham	2.14	13.20	0.87	31	12	86	11	40	26
Rothwell	J. More, M.D.	0.84	9.24	0.23	28	..	..	..	..	..
Oundle	S. P. Holloway	1.79	10.99	0.76	31	9	..	..	..	..
Towcester	J. Webb	1.69	12.53	0.94	21	9	..	..	..	..
Little Houghton ..	J. Brawn	1.96	13.03	0.91	31	10	70	9	51	27
Fawsley	Lady Knightley	2.03	13.17	0.80	31	10	80	9	44	25
Thorpe Manville ..	Seth Barnes	2.11	14.13	1.14	31	9	..	..	..	..
Floore	E. G. Loder	1.21	..	0.58	10	6	88	16	40	26
Twynwell Rectory ..	Rev. H. Waller	1.67	..	0.67	31	8	..	..	..	..
Whittlebury	W. S. Miller	2.16	14.28	1.18	31	8	87	11	35	4
Hazelbeach	Mrs. Albert Pell	2.08	..	1.27	31	8	86	8	48	26 & 28
Rockingham Castl.	H. Wate	2.21	14.75	1.01	31	7	..	..	..	..
Holdenby	J. Gregory	2.01	16.40	0.90	31	8	..	..	..	..
Kettering	C. W. Lane	2.35	13.65	0.52	31	9	..	..	..	..
Peterborough	J. Whitwell	1.57	11.84	0.94	31	7	87	8 & 11	43	27
Average 18 years 1866-83 ..	H. Terry	2.33	16.42	..	..	..	..	..	..	..

SEPTEMBER.

Northampton ..	H. Terry	1.14	13.86	0.31	3	11	71	17	38	29
"	F. Law	1.19	13.15	0.38	3	12	78	17	35	30
Castle Ashby ..	R. G. Scriven	1.50	15.33	0.45	3	13	80	17	33	29
Litchborough ..	Ed. Grant	1.07	15.52	0.36	21	12	85	17	36	29
Sedgebrook	C. Markham	1.60	14.80	0.52	3	15	79	17	30	30
Rothwell	J. More, M.D.	2.68	11.92	1.13	1	11	..	..	..	..
Oundle	S. P. Holloway	1.34	12.33	0.55	3	13	..	..	..	..
Towcester	J. Webb .....	..	..	..	..	..	..	..	..	..
Little Houghton ..	J. Brawn	0.97	14.00	0.25	21	12	..	..	..	..
Fawsley	Lady Knightley	1.23	14.40	0.37	21	13	73	17	36	29
Thorpe Manville ..	Seth Barnes	1.04	15.17	0.44	21	9	..	..	..	..
Floore	E. G. Loder	2.07	..	0.91	1	8	80	18	31	8
Twynwell Rectory ..	Rev. H. Waller	1.21	..	0.32	21	10	..	..	..	..
Whittlebury	W. S. Miller	1.76	16.04	0.48	3	13	79	17	27	29
Hazelbeach	Mrs. Albert Pell	1.85	..	0.37	2	7	75	17	44	5
Rockingham Castl.	H. Wate	1.35	16.10	0.39	21	9	..	..	..	..
Holdenby	J. Gregory	1.63	18.03	0.27	2	12	..	..	..	..
Kettering	C. W. Lane	1.41	15.06	0.25	4	16	76	17	33	33
Peterborough	J. Whitwell	1.41	12.75	0.39	21	8	78	17	39	29
Average 18 years 1866-83 ..	H. Terry	2.96	19.44	..	..	..	..	..	..	..

HENRY TERRY, SURGEON.

THE value of Phenological Observations lies in the deductions to be drawn from a great number of records made year after year as nearly as possible under the same circumstances. This is of course facilitated by limiting the number of species to be observed, so that the same plants, insects, etc., may be recorded year after year, and form a basis for deductions which could not be drawn from a far larger mass of records of species taken at random, in which case probably only a very small number will have been observed through an uninterrupted series of years.

Until this year there has been no station in the county sending reports to the Royal Meteorological Society ; I have undertaken the work this year, and it is to be hoped that henceforward we may have an unbroken series of records. With this view I have tabulated the reports sent up from Northampton for the present year, comparing the dates with the average date for the last five years (1879—1883 inclusive), compiled from the reports published by the R. Met. Soc. These averages are drawn from the records of about 25 stations, distributed throughout England ; but the stations S. of Northampton preponderate considerably over the more northerly ones, so that on this ground we might expect our records to be slightly behind the average.

If this can be done annually for several years, we shall be able to draw some interesting conclusions as to our position relative to the other stations in the country, and also as to the influence of local features on the time of the appearance of plants, etc. It should be remembered also that every new station, by increasing the sum of the records from which the averages are taken, renders those statistics the more reliable ; and the more accurate the general statistics, the more surely can we detect the part played by local features (latitude, altitude, temperature, etc.), in determining the variations of these phenomena.

In the second and third columns the dates are given, reckoning the date of the year, from the first of January, in accordance with the plan pursued by the R. Met. Soc., which of course facilitates the comparison of the dates.

Several of the plants were observed for me by Mr. W. Law, while I was absent from the town.

The plants are given in the order and with the numbers of the R. Met. Society's list. The fact that I have not been able to observe all the plants will account for the absence of dates to some of the species. I have only given the records of the *plants*, as my observations of the Ornithological and Entomological sections were very incomplete.

In the case of a few plants no average is given ; this is because these species have only been observed since 1883, when the list was revised and some considerable additions were made.

When the name of the species is enclosed in brackets it is to be understood that the plant observed was a cultivated specimen.

TABLE OF PHENOLOGICAL OBSERVATIONS, 1884.

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Species.	1884.		Average 1879-83.	Species.	1884.		Average 1879-83.
	Day of Month.	Day of Year.			Day of Month.	Day of Year.	
1. <i>Anemone nemorosa</i> ...	Mar. 13	73	79	41. <i>Galium verum</i>	June 29	181	184
2. <i>Ranunculus ficaria</i> ...	by Feb. 12	43	53	42. <i>Dipsacus sylvestris</i> ...	Aug. 2	219	211
3. <i>Ranunculus acris</i>	April 22	113	122	43. <i>Scabiosa succisa</i>	Aug. 16	229	215
4. <i>Caltha palustris</i>	Mar. 22	82	82	44. <i>Potastites vulgaris</i> ...			
5. <i>Papaver rhoeas</i>	June 2	154	158	45. <i>Tussilago farfara</i>	Feb. 13	44	62
6. <i>Nasturtium officinale</i> ...	May 24	145		46. <i>Achillea millefolium</i> ...	June 20	172	175
7. <i>Cardamine pratensis</i> ...	Mar. 21	81	106	47. <i>Chrysanthemum</i>			
8. <i>Sisymbrium alliaria</i> ...	April 2	93		<i>leucanthemum</i>	May 15	136	142
9. <i>Draba verna</i>				48. <i>Artemisia vulgaris</i> ...			
10. <i>Viola odorata</i>	Feb. 16	47	59	49. <i>Senecio jacobaea</i>	July 9	191	183
11. <i>Polygala vulgaris</i>	April 17	108	136	50. <i>Centurea nigra</i>	June 16	168	177
12. <i>Lychnis floa-cuculi</i> ...	May 24	145	150	51. <i>Carduus lanceolatus</i> ...			
13. <i>Stellaria holostea</i>				52. <i>Carduus arvensis</i>	June 29	181	185
14. <i>Malva sylvestris</i>	June 6	158	165	53. <i>Sonchus arvensis</i> ...	July 20	202	201
15. <i>Hypericum tetrap-</i>				54. <i>Hieracium pilosella</i> ...	May 25	146	142
<i>terum</i>	July 20	202	195	55. <i>Campanula rotundi-</i>			
16. <i>Hypericum pulchrum</i> ...				<i>folia</i>	July 18	200	194
17. <i>Geranium robertianum</i>	Mar. 6	66	123	56. <i>Ligustrum vulgare</i> ...	June 28	180	
18. [<i>Euonymus</i>				57. <i>Convolvulus sepium</i> ...	July 26	208	196
<i>europaeus</i>]	May 18	139		58. <i>Symphytum officinale</i> ...	May 28	149	128
19. [<i>Acer pseudo-platanus</i>]	April 15	106		59. <i>Pedicularis sylvatica</i> ...	April 17	108	126
20. <i>Aesculus hippo-</i>				60. <i>Veronica chamaedrys</i> ...	Mar. 24	84	111
<i>castanum</i>	May 14	135		61. <i>Mentha aquatica</i>	July 20	202	218
21. [<i>Cytisus laburnum</i>] ...	May 14	135		62. <i>Thymus serpyllum</i> ...			
22. <i>Trifolium repens</i>	May 23	144	146	63. <i>Prunella vulgaris</i>	June 7	159	170
23. <i>Lotus corniculatus</i> ...	May 26	147	142	64. <i>Nepeta glechoma</i>	Mar. 15	75	87
24. <i>Vicia cracca</i>	June 22	174	175	65. <i>Galeopsis tetrahit</i> ...	July 6	188	193
25. <i>Vicia sepium</i>				66. <i>Stachys silvatica</i>	June 11	163	164
26. <i>Lathyrus pratensis</i> ...	June 29	181	160	67. <i>Ajuga reptans</i>			
27. <i>Prunus spinosa</i>	Mar. 8	68	100	68. <i>Primula veris</i>	Mar. 24	84	94
28. <i>Spiraea ulmaria</i>	June 14	166	174	69. <i>Plantago lanceolata</i> ...	April 2	93	116
29. <i>Potentilla anserina</i> ...	May 13	134	140	70. <i>Mercurialis perennis</i> ..			
30. <i>Rosa canina</i>	June 2	154	160	71. <i>Ulmus montana</i>	Feb. 8	39	65
31. <i>Pyrus aucuparia</i>	by May 15	136		72. <i>Salix caprea</i>	Mar. 1	61	73
32. <i>Crataegus oxyacantha</i>	April 27	118		73. <i>Fagus sylvatica</i>			
33. <i>Epilobium hirsutum</i> ...	July 14	196	196	74. <i>Corylus avellana</i>			
34. <i>Epilobium montanum</i> ...	June 14	166	168	75. <i>Orchis maculata</i>	May 29	150	157
35. <i>Angelica sylvestris</i> ..				76. <i>Iris pseudacorus</i>	June 11	163	158
36. <i>Daucus carota</i>				77. [<i>Narcissus pseudo-</i>			
37. <i>Hedera helix</i>	Sept. 2	246	261	<i>narcissus</i>]	Feb. 28	59	72
38. <i>Cornus sanguinea</i>				78. <i>Galanthus nivalis</i>			
39. [<i>Syringa vulgaris</i>]	April 28	119		79. <i>Scilla nutans</i>	April 8	99	112
40. <i>Galium aparine</i>	May 14	135	142				

It will be seen from the above list that the great majority of the dates this year are considerably earlier than the average; but it must be remembered that until we can compare the reports from the other stations, we cannot tell whether this is due to local causes, or whether it is universally the case, and due to the favourable season.

H. N. DIXON.

A CATALOGUE OF THE GEOLOGICAL COLLECTION IN THE NORTHAMPTON MUSEUM.

PART II.

THE OLD RED SANDSTONE AND DEVONIAN SYSTEMS.

THE term Devonian was first given by Professor Sedgwick and Sir R. Murchison to certain rocks occupying a great portion of Devonshire and Cornwall. From these rocks fossils were obtained which were pronounced to be intermediate in character between those of the Silurian and Carboniferous strata. On these and certain stratigraphical grounds it was considered that they were the equivalent of a certain formation which in Wales and Scotland lies between the Silurian and Carboniferous rocks. This formation is called the Old Red Sandstone, in contradistinction to the New Red Sandstone, which overlies the Carboniferous strata. But how far the Old Red Sandstone and the Devonian beds are contemporaneous has not yet been fully explained, and as there is a considerable difference of opinion, it will be best to describe them separately. The late Professor Jukes, who had for some years been studying the Palæozoic Rocks in the South of Ireland, turned his attention to the Devonian strata in the South-west of Ireland, and came to the conclusion that they were of Carboniferous age and not equivalent to the Old Red Sandstone.

These Devonian rocks in Devonshire and Cornwall consist of a series of flaggy beds, green and purple sandstones and limestones, with a maximum thickness of 18,000 feet.

In North Devon they have been divided as follows :—

Upper Devonian ...	{ Pilton and Barnstaple beds.
	{ Marwood slates, Pickwell Down Sandstones.
Middle Devonian...	{ Mortehoe beds.
	{ Ilfracombe beds.
Lower Devonian ...	{ Lynton slates.
	{ Lynton sandstone.

In comparing the fauna of the Devonian strata with the Silurian, we find a large decrease in the number of species—the Trilobites for instance only number 13 species in the Devonian, as against 130 in the Silurian, while the whole fauna has dwindled from 1,200 species in the Silurian, to less than 400 in the Devonian ; but it is undoubtedly a marine fauna.

Remains of sponges are numerous in the middle division, and we have in the Museum a capital series of the characteristic form *Stomatopora concentrica*. Corals also largely occur in the middle division, chiefly from the neighbourhood of Torquay; many of these specimens being silicious, are cut and polished to show their internal structure. Among the corals is a very peculiar one called *Calceola Sandalina*; * “this has been successfully described as a lamellibranch, a hippurite, and a brachiopod, but is now regarded as a rugose coral, possessing an opercular lid.” Brachiopods are the most abundant kind of fossil; one of the most characteristic is a genus named *Stringocephalus*, and which is confined to the Devonian strata.

The Old Red Sandstone series consists of sandstones coloured more or less by a peroxide of iron, tilestones or flagstones, cornstones and conglomerates, with a maximum thickness of 10,000 feet. The Old Red Sandstone occupies a considerable portion of Herefordshire, Monmouthshire, and Brecknockshire, extending into Glamorganshire, Caermarthen, and Pembroke. The upper part of this system, consisting of conglomerates, red and gray sandstones, about 600 feet, has been traced in North Wales resting upon older beds, and overlapped by the carboniferous limestones. In the North of England, about Ulleswater, it attains a thickness of about 2,000 to 3,000 feet; but it is in Scotland that the Old Red Sandstone has been rendered classical by the graphic pen of Hugh Miller. It crosses the country from the Firth of Clyde to the Forfarshire coast; it occurs in Rossshire and Sutherland; throughout Caithness and the Orkneys. Like the Devonian rocks it is capable of three sub-divisions. In the southern part of Scotland it has been divided as follows:—

Upper	...	{ Red and yellow sandstones and conglomerates of Berwickshire and Fife.
Middle	...	{ Reddish, green, and gray sandstones, flagstones, and conglomerates, with contemporaneous volcanic rocks.
Lower	...	{ Red, chocolate-coloured, gray sandstones and shales, with large masses of contemporaneous volcanic rocks, occupying Ochil and the Pentland Hill.

In the North of Scotland the following divisions have been ascertained to be traceable in the Old Red Sandstone:—

Upper	...	{ Light red and yellow sandstones at Dunnet Head, the Orkney and Shetland Hills.
Middle	...	{ Gray and dark flagstones, occasionally calcareous and bituminous, covering a large area in Caithness.
Lower	...	{ Red sandstones and conglomerates, lying unconformably upon the metamorphic rocks of the Highlands.

* Text Book of Geology, by A. Geikie. Page 696.

It is the middle division of this northern type which contains that wonderful assemblage of fossil fishes, which Hugh Miller so clearly described in his work called "The Old Red Sandstone." No marine shells are found in Old Red Sandstone, but a fresh water form, *Anodonta Jukesii*, has been discovered in Ireland, in the upper division, with remains of land plants. Fishes possessing hard, bony-plated armour, of the genera which first made their appearance in the underlying beds (Upper Ludlow Rocks) are numerous. In "The Physical Geology and Geography of Great Britain," by Sir A. C. Ramsay, he says :—"The absence of marine shells and the nature of the fossil fishes of the Old Red Sandstone long ago, led Mr. Godwin Austen to infer that the formations were deposited, not on the sea, as had always been asserted, but in a fresh water lake, or a series of lakes. In this opinion I thoroughly agree, for the nearest analogues of many of the fish are the *Polypterus* of the African rivers, the *Ceratodus* of Australia, and in less degree the *Lepidosteus* of North America." Thus the absence of marine shells, the presence of a fresh water shell allied to the large mussel of our rivers and lakes, the remains of land plants and of fishes which resemble certain existing forms inhabiting rivers in Africa and America, all tend to prove that the Old Red Sandstone was of fresh water and not marine origin. Perhaps it may not be out of place here to state that during the recent boring for water at Gayton, at a depth of 889 feet, and underlying carboniferous strata, the boring passed through 105 feet of coarse red sandstones, with quits and marls; these beds may belong to the Old Red Sandstone, but at present the evidence is too limited in character to enable us to give a definite opinion.

Hugh Miller, whom we have mentioned above, was the author of several books on Scottish Geology, and it was "The Old Red Sandstone" which first came out in a series of articles in the *Witness* newspaper, that set Robert Dick, the Thurso Baker, in the right direction. Dick was an indefatigable worker in the Old Red Sandstone, and furnished numerous specimens to Hugh Miller, by which he was enabled to illustrate his works. The life of Dick has formed the subject of one of the numerous Biographical works of Samuel Smiles, from whose book the following description of Dick is taken; it is by a Mr. Peach, a native of Northamptonshire, of whom little is known in his own country, yet in the scientific world his name is widely known and respected. † "He is a very diffident man, but an enthusiast in Natural History pursuits. He is unmarried, and lives quite retired. In fact he is very little known in Thurso. He has a nice collection of Caithness ferns, beetles, and insects. He is deeply interested in Botany. His researches in Geology have been great, especially in the Old Red Sandstone, and some of his specimens have added new links to the history of these ancient rocks."

† Robert Dick, Baker, of Thurso, Geologist and Botanist, by S. Smiles, LL.D. Page 264.

The following is a list of the Devonian and Old Red Sandstone fossils now in the museum. It is to be regretted that the locality, as well as the formation from which they came, cannot be given, except in the case of the corals and a few others;—

DEVONIAN AND OLD RED SANDSTONE.

Upper Devonian	... Up. Dev.		
Middle Devonian	... Mid. Dev.	Old Red Sandstone	... O. R. S.
Lower Devonian	... Low. Dev.		

AMORPHOZOA.

	Formation.	Locality.
<i>Stomatopora concentrica</i> , Goldf.	... Mid. Dev...	Torquay.
<i>Stomatopora placenta</i> , Lons....	... Mid. Dev...	Torquay.

ACTIMOZOA.

<i>Acervularia coronata</i> , Edw. & Haime.	Mid. Dev...	Torquay.
<i>Acervularia Battersbyi</i> , Edw. & Haime.	Mid. Dev...	Torquay.
<i>Acervularia pentagona</i> , Goldf.	... Mid. Dev...	Newton.
<i>Acervularia</i> sp. ...	... Mid. Dev..	Torquay.
<i>Alveolites suborbicularis</i> , Lam.	... Mid. Dev...	Teignmouth.
<i>Alveolites</i> sp. ...	... Mid. Dev...	Torquay.
<i>Battersbyi</i> sp. ...	... Mid. Dev...	Torquay.
<i>Cyathophyllum helianthoides</i> , Goldf. ...	Mid. Dev...	Newton.
<i>Cyathophyllum cœpitesum</i> , Goldf. ...	Mid. Dev...	Torquay.
<i>Cyathophyllum obtortum</i> , Edw. & Haime	Mid. Dev...	South Devon.
<i>Calceola sandalina</i> , Linn ...	...
<i>Endophyllum Bowerbankii</i> , Edw. and Haime	... Mid. Dev...	Oddicombe.
<i>Favosites cervicornis</i> , Edw. & Haime ...	Mid. Dev...	Newton.
<i>Favosites Goldfussi</i> , Edw. & Haime ...	Mid. Dev...	Torquay.
<i>Favosites</i> sp. ...	... Mid. Dev...	Torquay.
<i>Hallia Pengellyi</i> , Edw. & Haime	... Mid. Dev...	Newton.
<i>Heliolites porosus</i> , Goldf. ...	... Mid. Dev...	Newton, Torquay.
<i>Smithia Pengellyi</i> , Edw. & Haime	.. Mid. Dev...	Torquay.
<i>Petraia celtica</i> , Lons. Mid. Dev...	Padstow, Cornwall.

BRYOZOA.

<i>Fenestella antiqua</i> , Goldf. Mid. Dev...	S. Devon.
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CRINOIDEA.

<i>Cyathocrinus geometricus</i> , Goldf. ...	Dev. ...	
<i>Platycrinus interscapularius</i> , Phil. ...	Dev. ...	

CRUSTACEA.

<i>Calymene trimerocephalus</i> ...	... Mid. Dev...	Torquay.
<i>Bronteus flabellifer</i> , Goldf....	... Mid. Dev...	S. Devon.
<i>Proteus</i> sp. ...	... Mid. Dev...	Newton,

BRACHIOPODA.

		Formation.	Locality.
<i>Atrypa aspera</i> , Schlot.	...	Dev.	...
<i>Atrypa desquamata</i> , Sow.	...	Dev.	...
<i>Atrypa reticularis</i> , Linn.	...	Dev.	...
<i>Cyrtina heteroclita</i> , Defr.	...	Dev.	...
<i>Rhynchonella cuboides</i> , Sow.	...	Dev.	...
<i>Rhynchonella pugnus</i> , var. <i>Anisodonta</i> , <i>Phil.</i>	...	Dev.	...
<i>Rhynchonella acuminata</i> , Martin	...	Dev.	...
<i>Rhynchonella implexa</i> , Sow.	...	Dev.	..
<i>Rhynchonella triloba</i> , Sow.	...	Dev.	...
<i>Spirifera disjuncta</i> , Sow.	...	Dev.	...
<i>Spirifera vespertilio</i>	...	Dev.	Illawara, Australia.
<i>Stringocephalus Burtini</i> , Defr.	...	Dev.	Eifel.

CONCHIFERA.

<i>Megalodon cucullatus</i> , Sow.	..	Dev.	..	Eifel.
<i>Pleurorhynchus minax</i> , Phil.	..	Mid. Dev...	S. Devon.	

GASTEROPODA.

<i>Acroculia vestusta</i> , Sow.	...	Dev.	...	
<i>Acroculia sigmidalis</i> , Phil.	...	Dev.	...	
<i>Loonema</i> sp.	...	Dev.	...	
<i>Macrocheilus</i>	...	Dev.	...	Eifel.
<i>Murschisonia angulata</i> , Phil.	...	Mid. Dev...	Plymouth.	
<i>Natica nexicosta</i> , Phil.	...	Dev.	...	
<i>Pleurotomaria cancellata</i> , Phil.	...	Dev.	...	

CEPHALOPODA.

<i>Clymenia striata</i> , Münst.	...	Mid. Dev...	S. Devon.	
<i>Othoceras</i> , several species	...	Mid. Dev ..	S. Devon.	

PISCES.

<i>Pterichthys</i>	...	...	O. R. S.	Scotland.
<i>Dipterus</i>	...	...	O. R. S.	Caithness.
<i>Osteolepis</i>	..	...	O. R. S.	Cromarty.

B. THOMPSON.
T. J. GEORGE.



ON SWALLOW HOLES AND DUMB-WELLS.

BY B. THOMPSON, F.C.S., F.G.S.

It is probably well known to the majority of the members of the Northamptonshire Natural History Society that one of the schemes for the water supply of Northampton now before the public, proposes to re-fill the nearly exhausted porous beds of the Middle Lias with water let in from the surface by means of artificial Swallow Holes or Dumb-Wells. I have been requested by the other members of the editorial committee to write a short paper on the subject of Dumb-Wells, hence this communication.

In Northamptonshire and the neighbouring counties, indeed I might say over the greater portion of England, we have a succession of pervious and impervious beds which a deep pit or bore hole would pass through. It is to this arrangement of beds that we owe all our spring water.

The strata themselves are mostly marine, and were evidently deposited over each other in a fairly even manner so as to produce horizontal beds, for they are nearly of the same thickness over a large area where they have not been exposed to denudation.

If these beds had been upraised equally so as to present a nearly horizontal land surface, and the upper one had happened to be impervious to water, it is clear there could have been no storage of fresh water in the porous beds below until the country had been carved into hills and valleys by the action of running water; and even then only the upper porous beds would have been exposed, for no river could cut a channel lower than sea level. The land now forming England was not upraised in this manner, but that portion to the west and north-west was raised considerably higher than that to the south-east, so that as denudation went on, the edges of the various beds underlying each other became exposed, and the porous ones commenced storing water.

Where a district is intersected with valleys, the water received by the upper pervious beds will generally discharge itself at a lower level around the sides of the hills, and so no important accumulation will take place. This discharged water may however be again received, together with other waters, by a lower porous bed which has no natural outflow at a lower level, and so be stored for use.

I think it will be evident to most people that water can only get into the porous beds of a district where they come to the surface, that is at their exposed edges, or outcrop as it is called. This exposed part is in many cases only a small part of the total area of the bed, so that to fill such a bed

by the rainfall upon the outcrop only would take a long time, nevertheless beds so situated are generally found nearly full when first tapped. It is quite possible for two or more deep seated springs at different depths to be made use of in a district.

So much deep seated water has been pumped of late years for the use of large towns that there are few water-bearing formations that do not show signs of exhaustion, and the artificial replenishing of these beds is admitted to be a subject of national importance, but how is it to be done ?

Before suggesting an answer to the question, let me put the following propositions before my readers, with whatever proofs may be necessary :—

1. The extent of any water-bearing bed is larger than the extent of its exposed part or outcrop, and in many cases the latter is only a fraction of the former ; therefore the water can be extracted by wells, etc., over a much larger area than the catchment area ; and since a single well yielding 1,000,000 gallons per day, or 365,000,000 gallons in the year, would extract one inch of the rainfall over about 25 square miles, it is not to be wondered at that the beds should be getting exhausted.

2. The outcrop of the various porous formations is generally covered by vegetation, which very largely absorbs the rainfall and returns it to the atmosphere by evaporation from its leaves ; also where the soil is rich in organic matter a good quantity of water may be retained in the upper layers by capillarity, to be slowly lost by evaporation in dry weather.

3. It frequently happens in the Midland and Eastern district that the rainfall is very unevenly distributed over the year, a heavy rain at times occurs in a district of small average rainfall ; where this is the case a large quantity of water must run off the ground without being in any way useful, even where the soil is fairly absorbent, and nearly the whole where the sub-soil is impervious.

4. The excessive drainage of the last fifteen or twenty years has undoubtedly had the effect of taking the water much more quickly into the river courses, and so to the sea, and as a consequence less water has got into the porous beds than before this drainage was carried out, and it affords another reason why the deep springs are beginning to fail. I may say that I do not attach as much importance to this as some people do.

5. The valleys into which the water finds its way before reaching the sea often receive the drainage of hundreds of square miles, but few of them offer any facilities for the conservation of this water, because they generally have a base of impervious rock. In some cases the river has cut down to a porous bed, which would absorb much of the water passing over it but for the accumulation of alluvium deposited there by the river itself for hundreds of years.

In some districts of England, where the rain does not fall on a porous bed, some portion gets into such beds by means of small natural openings called Swallow Holes, and in this way the amount of impounded water is considerably increased. Such openings are most common in the chalk and carboniferous limestone.

I only know of one such case in this county, but that is a very interesting one, pointed out to me by Mr. Rooke, of Weldon Grange. In a field occupied by Mr. Rooke, and situated not far from his home, there is a natural depression extending all along a field of stiff Boulder Clay, and in the depression are a number of openings, also natural, which receive and dispose of all the water which flows into them. There is little doubt that the porous bed receiving the water is the Lincolnshire Oolite, and that the depression has been produced by the solution or washing out of the limestone comprising the bed below. These particular Swallow Holes are not well situated to collect a large amount of water, but they materially aid the drainage of the adjacent land.

Now if a number of artificial Swallow Holes were made in suitable localities, *i.e.* in places now troubled with a superabundance of water, much of this water might be impounded and rendered useful for the supply of towns and villages. The details of such an arrangement I need not speak of here, but if it can be carried out economically it seems to offer, in other respects, important advantages to the district where it is adopted, as it would materially mitigate destructive floods, and at the same time replenish the now failing water supply from deep springs.

The particular advantage of such a plan over the construction of open reservoirs, independently of the cost and purity of the water, subjects which I have sufficiently treated of elsewhere, lies in the fact that each well, occupying only a few feet of surface, might be equivalent to an enlargement of the area of outcrop by several square miles. Thus :—supposing 1,000,000 gallons per day can be pumped from a single well in a porous bed, then clearly a Dumb-Well of the same dimensions would be capable of disposing of at least that quantity, and supposing 5 inches of the rainfall could be absorbed at the outcrop of the bed, then each such well would be equal to an addition of 5 square miles to the outcrop, if a sufficient supply of water were always available. The amount of water continuously available would vary very much in different districts—it would vary with the arrangements for collection—and whether connected with a permanent water-course or not. It would be beyond the objects of this paper to give an estimate of any particular case.

I remember visiting a clay pit at Welton, in this county, some two or three years ago, it was in the winter time, and the pit was so flooded that we could do nothing in the way of collecting fossils. I went again about a

year ago, and found one portion of the pit still flooded, but a deeper part contained no water, and on making enquiries the man told me that "a stream as thick as his arm might run in all day, but none would be seen at the bottom." In digging this deeper part they had reached the Middle Lias rock-bed, and through a fissure in this the water discharged itself as fast as it was received. What was here being done on a small scale might, I think, be done on a larger scale, and be of the utmost advantage to the country.

There seems to be no doubt whatever that the rainfall in this country is ample for the supply of all necessities, so that it is only a question of the proper conservation of the water. Open reservoirs might be multiplied, but I cannot think that they should be, seeing that underground ones already exist, which can easily be communicated with by means of wells.

Mr. C. E. De Rance, F.G.S., etc., estimates the pervious portions of the carboniferous, secondary and tertiary rocks of England and Wales at 26,600 square miles, and the impervious rocks of the same ages, which overlie pervious ones, at 19,000. These latter carry off the rainfall in the shape of floods, whereas the flood water might be largely let into the porous beds below by means of Dumb-Wells, where it would be carefully taken care of until required.

Dumb-Wells constructed in the stiff boulder clays occupying the hills of our own district of Northampton might often be serviceable in increasing the flow of water from springs in the beds below—it would make some of our intermittent springs more regular, and consequently help to increase the summer flow of the river.

Controversial matters have been, as a rule, kept out of our Journal, but we thought the subject here treated of of sufficient interest to justify us in breaking the rule, but it must be understood that the opinions expressed are those of the author, and not necessarily those of the editors.—THE EDITORS.



PHENOLOGICAL OBSERVATIONS.

TAKEN BY H. N. DIXON AND W. LAW IN THE NEIGHBOURHOOD
OF NORTHAMPTON, 1884.

April 3	Ribwort Plantain	...	...	<i>Plantago lanceolata</i>
4	Water Crowfoot	...	...	<i>Ranunculus aquatilis</i>
6	Sandwort	...	...	<i>Arenaria serpyllifolia</i>
„	Early Field Scorpion Grass.			<i>Myositis collina</i>
„	Ivy-leaved Toadflax...	...		<i>Linaria cymbalaria</i>
„	Herb Bennett...	...	...	<i>Geum urbanum</i>
„	Rue-leaved Saxifrage	...		<i>Saxifraga tridactylites</i>
9	Jack-by-the-hedge	...	...	<i>Alliaria officinalis</i>
10	Great Stitchwort	...	...	<i>Stellaria holostea</i>
„	Dovesfoot Cranesbill	...		<i>Geranium molle</i>
12	Spotted Orchis	...	...	<i>Orchis maculata</i>
„	Cow Parsnip	...	...	<i>Heracleum sphondylium</i>
17	Field Chickweed	...	...	<i>Cerastium arvensis</i>
„	Hairy Violet	...	...	<i>Viola hirta</i>
20	Upright Crowfoot	...	...	<i>Ranunculus acris</i>
„	Wild Crab	...	...	<i>Pyrus malus</i>
25	Vernal Water Starwort	...		<i>Callitriche verna</i>
27	Wild Navew	...	...	<i>Brassica napus</i>
28	Lilac	...	...
May 4	Broom	...	...	<i>Cynsus scoparius</i>
„	Red Campion...	...	...	<i>Lychnis diurna</i>
„	Cuckoo-pint	...	...	<i>Arum maculatum</i>
„	Sowthistle	...	...	<i>Sonchus oleraceus</i>
8	Shepherd's Needle	...	...	<i>Scandix pecten</i>
10	Sweet-scented Vernal Grass.			<i>Anthoxanthum odoratum</i>
„	Meadow Saxifrage	...	...	<i>Saxifraga granulata</i>
„	Yellow Nettle	...	...	<i>Galeobdolan luteum</i>
„	Hawthorne	...	...	<i>Crategus oxyacantha</i>
12	Bitter Winter Cress...	...		<i>Barbaria vulgaris</i>
„	Maple	...	...	<i>Acer campestre</i>
„	Crosswort	...	...	<i>Galium cruciatum</i>
13	Silver Weed	...	...	<i>Potentilla anserina</i>
„	Common Sorrel	...	...	<i>Rumex acetosa</i>
14	Laburnum	...	...	<i>Cytisus laburnum</i>

May 14	Horse Chestnut	...	...	<i>Æsculus hippocastanum</i>
„	Goose Grass	...	...	<i>Galium aparina</i>
„	Barren Broom Grass	...	...	<i>Bromus sterilis</i>
„	Oak	...	...	<i>Quercus robur</i>
15	Ox-eye...	...	...	<i>Chrysanthemum leucanthemum</i>
„	Earth Nut	...	...	<i>Bunium flexuosum</i>
„	Broad-leaved Garlic..	...	...	<i>Allium ursinum</i>
17	Spindle Tree	...	...	<i>Enonymus europeus</i>
18	Green-winged Meadow Orchis	...	...	<i>Orchis morio</i>
„	Brooklime	...	...	<i>Veronica beccabunga</i>
„	Wayfaring Tree	...	...	<i>Viburnum lantana</i>
19	Zigzag Trefoil	...	...	<i>Trifolium medium</i>
20	Corn Gromwell	...	...	<i>Lithospermum arvensis</i>
„	Wild Sage	...	...	<i>Salva verbenaca</i>
„	Curled Dock	...	...	<i>Rumex crispus</i>
21	Tufted Water Scorpion Grass	...	...	<i>Myosotis cæspitosa</i>
„	Pendulous Water Carex	...	...	<i>Carex sylvatica</i>
22	Yellow Rattle	...	...	<i>Rhinanthus crista-galli</i>
„	Silver Weed	...	...	<i>Potentilla anserina</i>
„	Wild Raspberry	...	...	<i>Rubus idæus</i>
„	Mouse-ear Hawkweed	...	...	<i>Hieracium pilosella</i>
23	Dutch Clover...	...	...	<i>Trifolium repens</i>
„	Smooth-stalked Meadow Grass	...	...	<i>Poa pratensis</i>
„	Narrow-leaved Oat Grass	...	...	<i>Avena pratensis</i>
24	Ragged Robin	...	...	<i>Lychnis flos-cuculi</i>
„	Water Cress	...	...	<i>Nasturtium officinali</i>
„	Jagged-leaved Cranesbill	...	...	<i>Geranium dissectum</i>
„	White Campion	...	...	<i>Lychnis vespertina</i>
26	Birdsfoot Trefoil	...	...	<i>Lotus corniculatus</i>
„	Common Vetch	...	...	<i>Vicia sativa</i>
„	Smooth Tare	...	...	<i>Vicia tetraspermum</i>
„	Goats' Beard	...	...	<i>Tragopogon pratensis</i>
„	Great Nettle	...	...	<i>Urtica dioica</i>
„	Hairy Carex	...	...	<i>Carex hirta</i>
„	Floating Meadow Grass	...	...	<i>Poa fluitans</i>
„	Elder	...	...	<i>Sambucus nigra</i>
27	Wild Camomile	...	...	<i>Matricaria chamomilla</i>
„	Marsh Nasturtium	...	...	<i>Nasturtium palustre</i>
„	Bog Stitchwort	...	...	<i>Stellaria uliginosa</i>
„	Marsh Orchis...	...	...	<i>Orchis latifolia</i>
29	Water Dropwort	...	...	<i>Æanthe fistulosa</i>
„	Dewberry	...	...	<i>Rubus cæsius</i>

May 30	Knot Grass	<i>Polygonum aviculare</i>
„	Wall Barley	<i>Hoadeum marinum</i>
„	Prickly-headed Poppy ...	<i>Papaver argemone</i>
June 1	Scarlet Pimpernel	<i>Anagallis arvensis</i>
„	Stinking Camomile	<i>Anthemis cotula</i>
2	Bladder Campion	<i>Silene inflata</i>
„	Common Poppy	<i>Papaver rhæas</i>
„	Dog Rose	<i>Rosa canina</i>
„	Black Briony	<i>Tamus communis</i>
„	Butterfly Orchis	<i>Habenaria bifolia</i>
„	Twayblade	<i>Listera ovata</i>
3	Quaking Grass	<i>Briza media</i>
„	Buckthorne	<i>Rhamnus catharticus</i>
4	Slender Foxtall Grass ...	<i>Alopecurus agrestis</i>
„	Hoary Plantain	<i>Plantago media</i>
5	Dwarf Mallow	<i>Malva rotundifolia</i>
6	Common Mallow	<i>Malva sylvestris</i>
7	Self-heal	<i>Prunella vulgaris</i>
„	Gout Weed	<i>Ægopodium podagraria</i>
8	Hairy Tare	<i>Vicia hirsuta</i>
„	Water Speedwell	<i>Veronica anagallis</i>
„	Trailing Tormentil	<i>Potentilla reptans</i>
10	Forget-me-not	<i>Myosotis palustris</i>
„	Woody Nightshade	<i>Solanum dulcamara</i>
11	Yellow Water Iris	<i>Iris pseudacorus</i>
„	Hedge Woundwort	<i>Stychn sylvatica</i>
„	Hop Trefoil	<i>Trifolium procumbens</i>
„	Greater Plantain	<i>Plantago major</i>
12	Meadow Rue	<i>Thalictrum flavum</i>
13	Broad-leaved Dock	<i>Rumex obtusifolius</i>
„	Water Figwort	<i>Scrofularia aquatica</i>
14	Meadow Soft Grass	<i>Holcus lanatus</i>
„	Meadow Sweet	<i>Spirea ulmaria</i>
„	Broad-leaved Willow Herb..	<i>Epilobium montanum</i>
„	Greater Knapweed	<i>Centaurea scabiosa</i>
„	Wild Parsnip... ..	<i>Postinaca sativa</i>
„	Nipplewort	<i>Lapsana communis</i>
„	Green-veined Dock	<i>Rumex sanguineus</i>
„	Yarrow	<i>Achillea millefolium</i>
„	Yellow Melilot	<i>Melilotus officinalis</i>
„	Yellow Toad Flax	<i>Linaria vulgaris</i>
„	Purple Medicu	<i>Medicago sativa</i>

June 15	Stinging Nettle	...	...	<i>Urtica urens</i>
16	Black Knapweed	...	..	<i>Centaurea nigra</i>
17	Musk Thistle...	...	...	<i>Carduus nutans</i>
25	Water Plantain	...	...	<i>Alisma plantago</i>
26	Corn Marigold	...	...	<i>Chrysanthemum segetum</i>
28	Privet	...	...	<i>Ligustrum vulgare</i>
„	Bindweed	...	...	<i>Convolvulus arvensis</i>
29	Yellow Bedstraw	...	...	<i>Galium verum</i>
„	Field Thistle	...	...	<i>Carduus arvensis</i>
„	Meadow Veitchlin	...	...	<i>Lathyrus pratensis</i>
„	Black Horehound	...	...	<i>Ballota nigra</i>
July 3	Meadow Geranium	...	...	<i>Geranium pratense</i>
4	Common Dropwort	...	...	<i>Spirea filipendula</i>
„	Great Burnet...	...	...	<i>Sanguisorba officinalis</i>
6	Hemp Nettle	...	...	<i>Galeopsis tetrahit</i>
„	Rose-bay Willow Herb	..	...	<i>Epilobium angustifolium</i>
„	Fine-leaved Heath	...	...	<i>Erica cineria</i>
13	Corn Blue Bottle	...	...	<i>Centaurea cyanus</i>
„	Corn Cockle	...	...	<i>Agrostemma githago</i>
„	Wild Thyme	...	...	<i>Thymus serpyllum</i>
„	Harebell	...	...	<i>Campanula rotundifolia</i>
14	Great Willow Herb	...	...	<i>Epilobium hirsutum</i>
17	Small Upright St. John's Wort	...	...	<i>Hypericum pulchrum</i>
„	Perforated St. John's Wort..	...	...	<i>Hypericum perforatum</i>
20	Square-stalked St. John's Wort	...	...	<i>Hypericum quadrangulum</i>
„	Corn Sowthistle	...	...	<i>Sonchus arvensis</i>
„	Hairy Mint	...	...	<i>Mentha hirsuta</i>



ORNITHOLOGICAL NOTES.

THE Hobby (*Falco subbuteo*) has again been observed this summer.

A pair of Long-eared Owls (*Strix otus*) were shot at Harleston Firs, 1880.

I have received reliable information that the Woodcock (*Scolopax rusticola*) has again bred in this county, viz., at Spratton, where one was seen July 12th, and several young ones August 2nd, 1884. They have been known to breed at Hardwicke, Castle Ashby, and Overstone.

We have observed a greater number of Wheatears (*Sylvia ænanthe*) this autumn than in former years.

The Nightingale (*Sylvia lusciniæ*) has been unusually abundant this year in this part of the county.

Common Snipe (*Scolopax gallinago*) were observed at Moulton in August of this year.

A Jack Snipe (*Scolopax gallinula*) was shot at Moulton, Oct. 1st, 1884.

Three Wild Geese were observed at Upton, September 18th, 1884, winging to the north-west, though of what species we could not determine.

We have observed a greater number of Landrails (*Crex pratensis*) this year than usual.

Two Great Crested Grebes (*Colymbus cristatus*) were seen at Naseby Water in the winter of 1883-84.

Green Sandpipers (*Tringa ochropus*) have been seen at Spratton, April 26th, and at Moulton, October 10th of this year.

Redwings (*Turdus Iliacus*) were seen at Moulton, October 13th, and a large flock were flying about the town on the evening of 20th October, doubtless attracted by the lights.

Several Quails (*Perdix coturnix*) were seen at Spratton, September 12th of this year.

ARRIVAL OF SUMMER VISITORS, 1884.

Chiff-Chaff (*Sylvia rufa*), March 17th.

Willow Warbler (*Sylvia trochilus*), April 6th.

Swallow (*Hirundo rustica*), April 20th.

Martin (*Hirundo urbica*), April 26th.

Two other faults (No. 3, Pl. I.) between Duston and Dallington throw down the Great Oolite between them, but whether they have disturbed the whole of the Upper Lias and extended to the Marlstone is not known; perhaps they may be further examined at some future time, and the depth to which the fracture reached, calculated.

In examining the outcrop of the Marlstone near Northampton, where it occurs in the neighbourhood of Milton, Rothersthorpe, Bugbrook, and is bounded on the north by the above-mentioned great fault, it will be noticed that it covers a large area of ground—some 5,000 acres in extent. This wide outcrop of such a comparatively thin bed as the Marlstone shows a very slight dip, which fact is borne out when the bed is traced eastward, under Hunsbury Hill, to the lower part of the town at Bridge street. The slope of the bed is not more than 12 feet per mile from Gayton boring to the west side of Hunsbury Hill, where it is at an elevation of 220 feet above sea level.

In the lower part of the town the Lias has been met with at two places. I refer to the well sunk at the brewery of Messrs. P. Phipps & Co., in 1879, and to a boring made by the L. and N. W. Railway Co., at their Bridge street station, in 1846. These are marked E and F respectively on the section, Pl. II.

At the well of Messrs. P. Phipps & Co., below 27 feet of gravel and surface accumulation, a series of beds of clay and rock were met with, nearly 30 feet in thickness. These beds represent the Middle Lias, and from their position in this well seem to be continuous with those in the Rothersthorpe area. A little water was found in this bed. The well was continued to a total depth of 100 feet into the clays of the Lower Lias.

There is but little record * of the Bridge street station boring, the only reference to the Liassic Beds being as follows :—

Superficial accumulation, consisting of detrital gravels, dark tenaceous clays, with erratic boulders	... 46 feet.
Lias blue clay, with bands of stone	... .. 550 feet.

If the Marlstone was met with at all in this boring it must have been in the first 46 feet, for the 550 feet of 'Lias blue clay, with bands of stone,' exactly represents the Lower Lias series, which at the Kettering road boring and the Gayton boring was 546 feet and 553 feet in thickness respectively. Possibly the beds being in the middle of the valley may have suffered erosion by the river, which in prehistoric times was of much larger dimensions than at the present, or more probably the clays and erratic boulders may have been the alternate beds of clay and rock which occur at the same elevation in the brewery well. It is also recorded that at this boring no water was met with until the Lias clays had been pierced at a depth of 596 feet, and 54 feet of sandstones penetrated.

* Q. J. G. S., Vol. XL., p. 483.

DISTRICT ROUND NORTHAMPTON.

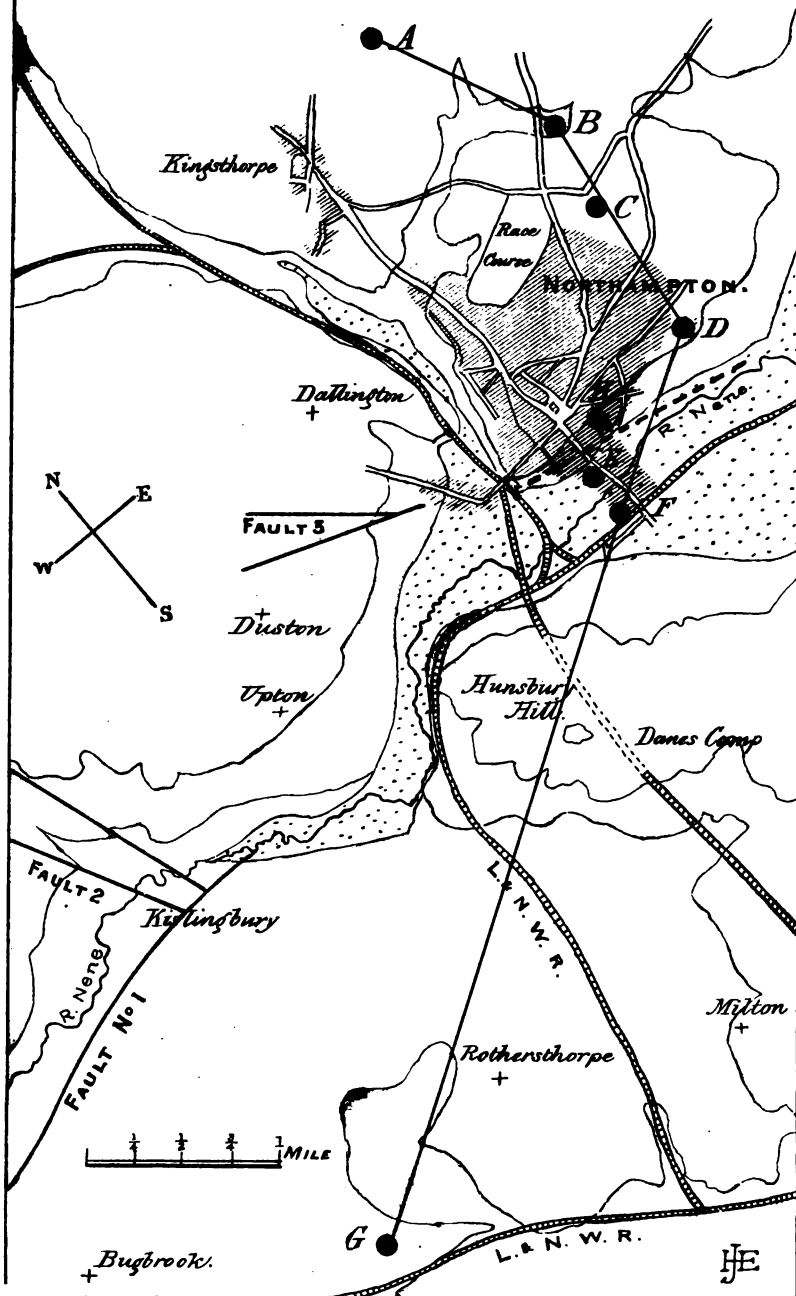
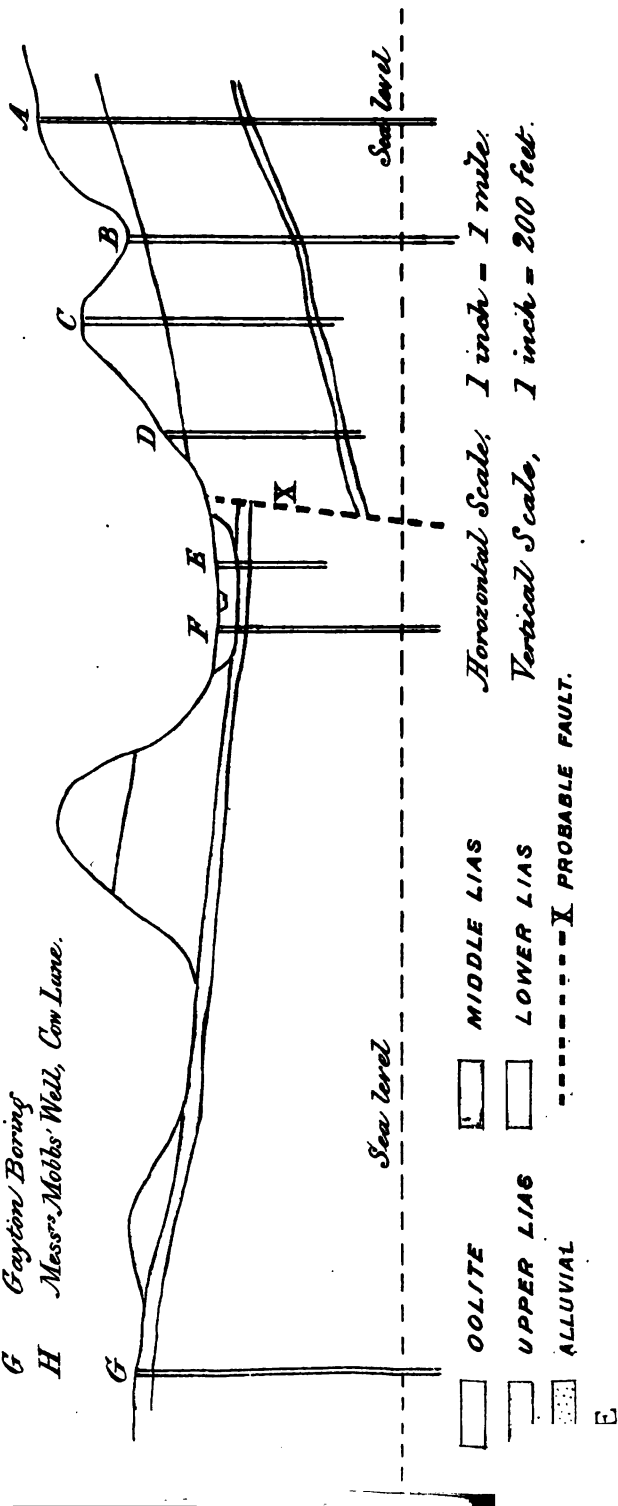


PLATE II
SECTION ON LINE G A

- A Kingshorpe Shaft
B Kettering Rd. Boring
C Reservoir Boring
D Billing Rd. Well
E Messrs Phipps' Well
F Bridge Street Station Boring
G Gayton Boring
H Messrs Mobbs' Well, Cow Lane.



On the accompanying Section Pl. II. will be seen laid down the several wells and boring between and including the Gayton boring and the Kingsthorpe shaft, all at which the Middle Lias has been met with. It will be noticed that the dip of the Marlstone from the north is very constant, but rather steep, comparatively speaking, being about 43 feet per mile. It has been mentioned that from Naseby to Northampton it is about 36 feet per mile, and from Orton, near Rothwell, to the town, it is found to be about 23 feet in the mile, thus showing a much greater depression nearer the town. It will also be noticed on the section that the Oolite series above the Upper Lias also shows a decided dip, which appears to be in uniformity with the Marlstone below.

We have thus traced the Marlstone, from Gayton eastward to the town as far as the Brewery well, where it is about 150 feet above sea level, and in its whole course sloping very slightly; whilst on the other side we have noted its course from the north as far south as the Billing road well, where it is only 75 feet above sea level, and sloping rather considerably. The only way to account for this great difference of level in the Brewery well and the Billing road well, which amounts to about 70 feet, is to suppose that a fracture of the earth's crust has taken place between these two sites and caused a fault, which has thrown the Marlstone at the Billing road well against the impervious Lower Lias clays, thus completely severing the continuity of the bed.

It is impossible to exactly localize the fault, but at a well sunk at Messrs. Mobbs' Foundry in Cow Lane, some 48 years ago,† the Middle Lias was met with, and was found to be at about the same level, within a few feet, as the bed at the Billing road well. This brings the position of the fault between the Foundry well and the Brewery well and within a limit of about 600 yards.

Plate I. represents the district round Northampton, showing the positions of the wells and borings referred to in this paper. The various geological formations are coloured. The alluvium is left untinted.

Plate II. is a section from Gayton boring to Billing road well and to the Kingsthorpe shaft; also the probable position of the fault.

HENRY J. EUNSON, F.G.S.

November 8th, 1884.

† Journ. North. Nat. His. Soc., Vol. I., p. 291.

MEETINGS OF THE SOCIETY.

AUGUST.

19th—Twelve members present. The following were elected members of the Society :—Mr. E. Turner, The Lindens, Mr. W. E. Stimpson, 3, Elysium Terrace, and Mr. R. Pursell, Garryland House, Billing Road.

On the 21st there was an afternoon excursion to Althorp Park, which, though not well attended, was enjoyed by the few members who went, and the treasures of Althorp House were thoroughly appreciated.

SEPTEMBER.

8th—Eight members present. Mr. H. N. Dixon exhibited a moss—*Ceratodon conicus*, from Duston ; this moss has only once been previously recorded in England—

On Thursday, the 4th, through the kindness of E. G. Loder, Esq., there was an excursion to Floore. Nineteen members and friends mustered at the Castle Station, to leave by the 12.20 train. Floore was reached about two o'clock, the party stopping on the way from Weedon station to listen to Mr. B. Thompson's interesting remarks on a gravel pit in the Glacial Drift. On reaching Floore, the members were met by Mr. Shortt, who conducted them round the grounds, and through the various green-houses, explaining and pointing out the chief objects of interest. After inspecting the church, they partook of Mr. Loder's hospitality, much regret being expressed that Mr. Loder was not present to receive the personal thanks of the party for his kindness. A pleasant stroll across the fields to Weedon, in time to catch the 5.40 train home, finished a most enjoyable afternoon.

22nd—Five members present. Mr. W. D. Crick showed a very fine specimen of the head of a *Leptolepis* (a fish), from the Fish and Insect Beds of the Upper Lias, at Allexton, in Leicestershire.

OCTOBER.

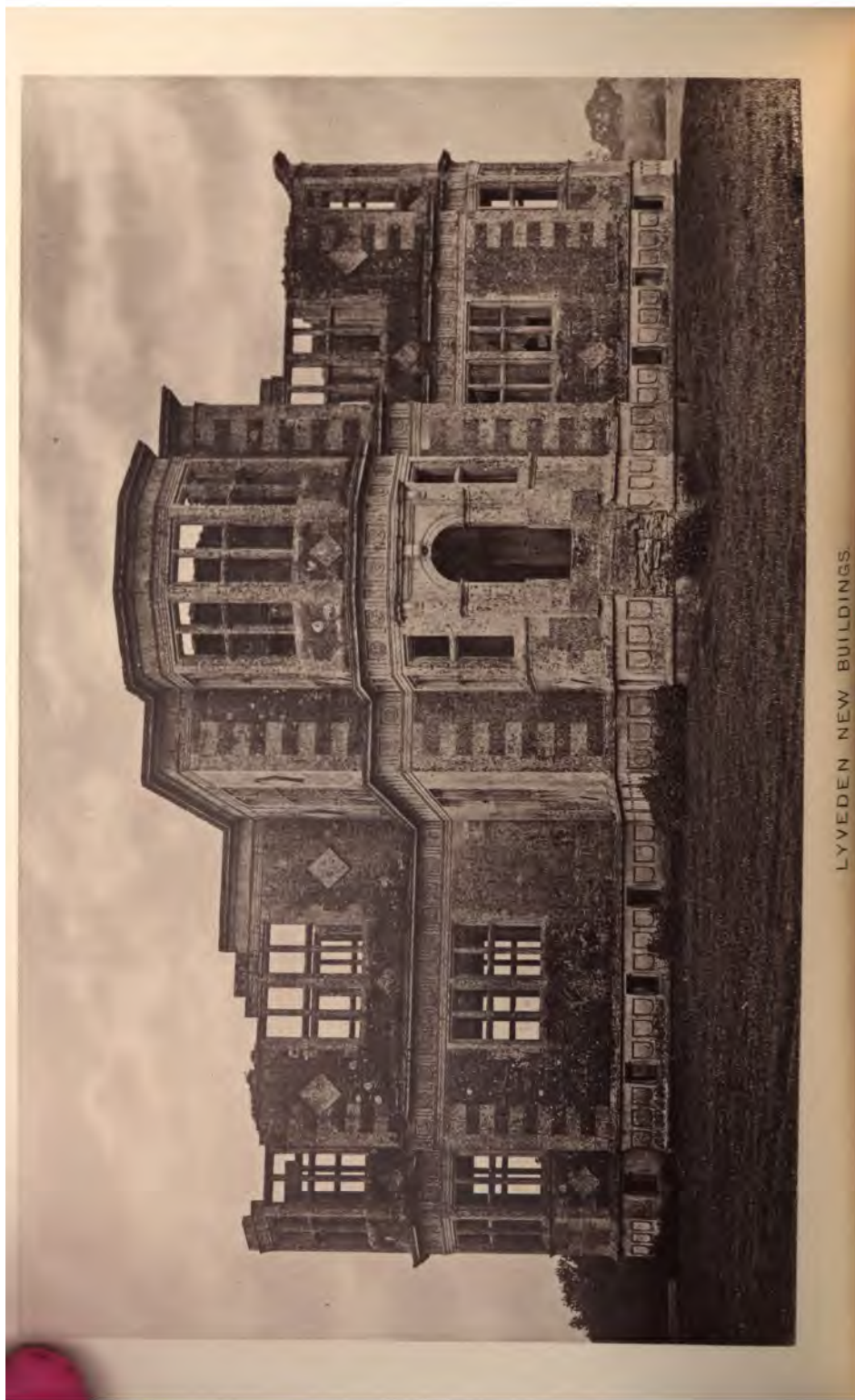
7th—Ten members present. Mr. H. N. Dixon showed *Webera annotina*, *Bryum Erythrocarpum*, mosses both new to Northamptonshire, and *Barbula latifolia* in fruit ; he also read a letter from Dr. Braithwaite, stating that the *Catharinea* discovered by Mr. Dixon, in the spring of this year, was a new species to Europe. A vote of thanks to Mr. Dixon for his kindness in usually bringing his Botanical finds for inspection, was carried unanimously.

21st.—Eighteen members and friends were present to listen to Mr. C. E. Crick, on "The Structure of Leaves." This short address inaugurated the Microscopical evenings for the winter session, and, as a sample of what is wanted for these evenings, it could not be improved upon, for the lecture was very interesting, and not too long. Objects illustrating the subject were shown under the microscope by Mr. A. Kempson and Mr. W. A. Law. Mr. T. B. Slye was elected a member.

ANNUAL SOIREE.

ON TUESDAY, October 28th, the annual Soiree was held at the Science and Grammar Schools, through the kindness of Mr. B. Thompson and the Rev. S. J. W. Sanders, and considering the counter attractions it was well attended. About 300 members and visitors were present. In the centre hall Sir Herewald Wake, Bart., opened the soiree with a short address on "Primæval Man," followed by Mr. W. J. Harrison, F.G.S., F.C.S., of Birmingham, who lectured on the "Ice-age and the Stone-age;" this lecture was capitally illustrated by the oxy-hydrogen lantern. After an interval of twenty minutes, during which the visitors had time to inspect some of the numerous articles on exhibition in the various class-rooms, the Rev. Robt. Baker, F.S.A., of Hargrave, gave an address on the "Romans in Northamptonshire," a subject with which he is most conversant, for it was Mr. Baker who superintended the excavations at Irchester. After another short interval, Mr. R. G. Scriven concluded the lectures with a few remarks on "The Saxons and Danes, with a few words about Danes' Camp," and it is to be hoped that the excellent advice given by Mr. Scriven in his lecture on the desirability of all "finds" being collected to one centre will be followed out by members of our society at least.

In the first class-room on the left-hand side after entering the large hall were exhibited:—Shells, Corals, etc., by Mr. Knight, Mr. E. Tye, and Mr. J. Phipps; a collection of Birds' eggs, by Sir Herewald Wake—this collection has since been presented to our society; Birds of Flamborough Head and their Eggs, by Rev. Geo. Nicholson; a large collection of British Moths and Butterflies, presented to the Northampton Museum by the Rev. G. Hilton; some very fine Indian Butterflies, etc., by Mr. Carroll. In the next class-room on the same side of the hall were the Botanical specimens, which included a collection of Wild Fruits, by Mr. T. G. West; Dried Fruits, by Mr. Rogers; Cut Flowers, etc., by E. G. Loder, Esq., of Floore, amongst which was a green rose; Mr. J. Phipps showed a nice collection of Australian Ferns. In the laboratory were the Bird Skins, presented to the society by our worthy President, and a capital lot of Northamptonshire Birds and Fishes, all of which had been stuffed and set up by Mr. W. Ball. In the physical science class-room various objects under the microscope were exhibited by Messrs. A. Kempson, E. A. Durham, G. C. Osborne, Thos. Osborn, T. H. Woolston, W. A. Law, B. Thompson, H. J. Eunson, C. E. Crick, J. Phipps, and Miss Borton. In this room was a collection of Geological specimens, from Canada, collected by Mr. H. J. Eunson. In the head master's rooms were exhibited collections illustrating the different lectures;



LYVEDEN NEW BUILDINGS.

FEDERAL RESERVE BANK OF NEW YORK

• 100 •

[illegible]

There is one tall hedgerow that once seen can never be forgotten. It is full of nests and blossom in the spring, and casts a pleasant shade in the evening when the hot sun is fading upon the earth and corn fields, and the



NORTHAMPTONSHIRE NATURAL HISTORY SOCIETY & FIELD CLUB.

No 21. February, 1885.

THE BOOK OF NATURE.

A PARADISE OF BIRDS.

THAT every thing in nature is beautiful, but, that there are many things more beautiful than others, is well known to every one—the simple flowers by the way side are beautiful, but how much more so are the glorious and delicate blooms that adorn the conservatories of the florist. The simple green grass field, and the equally simple hedgerow, are very beautiful to the dwellers in the haunts of crowded cities, who day by day and week by week look only upon the gaudy shops and grim streets. But there are beautiful places where nature seems to have planted gardens for herself to love and dwell in. These spots are dear to all loyal hearts. It is only the soul that is ever hunting and thirsting after the dust that perisheth with the breath, that cannot enjoy these grand gardens of the world. One might imagine, seeing the eagerness of men seeking wealth, that life would last for a thousand years, and that the world would grow old—fail to produce abundance—and leave multitudes to perish of hunger. Such despise the glory that God has placed about them, and go out of the world at three score and ten, maybe, as ignorant of God's works as tho' they had been born blind.

Many times have I journeyed to Achurch and across to Pilton, to look upon the meadows, the woods, the hedgerows, and the river, to listen to the song, or to watch the multitudes of the feathered tribes living their life in the homes they had chosen. In the spring, when the fields were full of blossom, and in the summer when the hay was thick upon the ground and the sweet scent filled all the country, and again, in the autumn, when all had been gathered in and one general harvest thanksgiving was to be seen and heard on every side.

There is one tall hedgerow that once seen can never be forgotten. It is full of nests and blossom in the spring, and casts a pleasant shade in the summer, when the hot sun is falling upon the earth and corn fields, and the

fruit ripening and maturing all for the great ingathering—and in the autumn it is mellow and grand as a good soul full of fruit, waiting to be called to the great home of eternity.

It was an autumn morning, the corn was all gathered in and the fruit had gone from the gardens and the orchards. A few leaves were rustling from the trees, and here and there a flight of sparrows would start up and hasten away noisy, and chattering, as tho' full of most important business. Where could all that crowd of brown little creatures have come from? Had they come from the towns and villages to pay their neighbours in the country a visit at this time of the year, when the hedgerows are full of fruit, and the fields full of corn—the leavings of the gleaners—knowing that no one will disturb them in their revels, or scare them from their feast? Such crowds are not to be seen in the spring, or the summer, and only when the abundance of autumn is past do they disappear—go back to their old corners in the village, to the barns, the warm thatch roof, or to the streets of the town, to pick up the crumbs, and to chirp, and chatter, and remind man that there is yet the wide expanse of nature outside the busy towns. These sparrows are a hungry, busy, energetic little people, loving to live near the haunts of men. Now, however, the little fellows were out for a holiday, and they were fully intent upon enjoying themselves, as one could learn from the gossip and chatter and frolic.

How much writing and speaking we have to-day showing the advantages of picture galleries, art exhibitions, and such places; on education, and to be sure, such collections of works—the productions of the best minds—cannot fail to leave some impression upon those who look upon them. But how much more graphic—how much more telling are the pictures from the hand of Nature, wide, rich, full of song and sunlight—pictures that come again in all their life and colour by the fireside in the stern, strong, days of winter, or, when one is resting for an hour 'mid the noise and worry and shams that are to be found in the hives of men.

One of those never-to-be-forgotten pictures is to be seen in those meadows in North Northamptonshire. The foliage was just getting a touch of yellow and crimson—that looked like bunches of blossom in the branches of the great trees, as tho' the wood sides had been turned into a wide border of some ancient English garden. The clear white water of the river was to be seen for many a fathom, now and again hidden by a sudden bend of the stream, then flashing out into bright sparkling pools, or long slender threads of silver. It was this placid river that gave the picture so much of life and beauty. Here was everything to make a royal home for the children of nature, and here the feathered tribes had come as to the palace of a king—seeming to know they were under the protection and loving eye

of a friend. At every step there was a fullness of life. The river swarmed with fish—they could be seen languidly sailing, or darting about like flashes of light in the clear water. The little sedate moorhen hurried in and out among the tall reeds that tossed their heads in the gentle breeze.

I was standing for a moment looking up the stream, listening to the short snatches of song from a lark that was too languid to mount heavenwards, and yet, anxious to chant a few notes of praise in honour of the great glory that was in all the world, when, with a slight rustle of the rushes, there fled up the river a kingfisher—one of those lovely creatures that are as rare as they are beautiful.

Whoever has missed such a sight has lost one of the miracle touches of nature—to see so bright and swift-winged a creature start from the bushes—the sunlight falling upon its wings, and the clear stream breaking in a thousand ripples and sparkles beneath. It is as tho' a patch had been shot from the centre of a rainbow, and, taking the form of life, had winged its way by the crimson and golden tinted foliage. Noiseless, and with flashing wings it sped up the stream, until hidden in the more sober, but yet gorgeous colours of the bushes. It was one of those moments that cause so much regret that sin should have come to blight the fair face of the world, and when one falls into dreaming of what the world will be at that time when the new heaven shall shine upon a new earth and the reign of death shall have ceased.

But it is not the meadow, it is the long hedgerow that at this season has such charms, for it is full of birds of all kinds, come to feed upon the ripe fruit that is crowded upon it. The bright red and crimson of the hips and haws, and the yellow and pink of the wild apple among the autumn leaves make it a favorite banqueting house of the birds at this season of the year. It is here than one can look upon them in all their gay and giddy chattering and frolic and fun. Never at any other season is there so much noise. It is a great re-union of families and friendships:—there is the black-bird, with his shining jet plumage, and keen eye, and quick graceful movements; the inquisitive little tom-tit; the pretty little shy blackcap; the clever, lively little linnet, gossiping with every one she passes. There are finches and wrens,—the latter busy little fellows never for a moment at rest, darting in and out, hunting from the top to the bottom of the hedge, daintily picking here and there; then, with a startling cry of alarm, the thrush will burst from the thicket and hurry forward some score or two yards, followed by a crowd screaming and chattering; but soon forgetting their alarm, again alight among the berries and fruit and renew their friendly greetings. Among the crowds can be seen one or two robins that always hold aloof from their kindred, never joining in the fun and merriment with the rest of their fellows.

There are few snatches of song to be heard. It is not a time for singing. One must come early on a morning in the spring, or, in the evening, to listen to the great concert—then the air vibrates with melody. It is to-day a great gathering—a holiday, and from end to end the hedgerow is full of birds. Hundreds, aye thousands, all having so much to say, and all telling their stories at once. It is a very Babel of voices, and were it not that there is no discordant note would not be so pleasant to listen to.

But the sun is sinking over the tops of the trees, and not wishing to trespass too long on the good lands of the generous lover and protector of the songsters, we hasten onward starting a watchful heron from among the rushes, that rising lazily proceeds towards some other feeding place in the distance,—while from every direction the birds are hastening to the shadows of the woods, or the mazes of the long hedge, where the mirth is growing more furious.

The crows are already in their ancient quarters, discoursing to each other in sober manner, as indifferent to the rest of the feathered tribe—their frolics and gambols—as tho' they were not in the world. The sun and the light disappear, and the night comes down upon the fields and the woods, and there is a great silence, broken only by the soothing sound of the fitful rustle of the wind among the branches. All is at rest and peace, lying in the hand of God, never doubting but that the morrow's sun will shine upon the world and wake all again to life and glory.

WM. BARTON.



THE FLORA OF NORTHAMPTONSHIRE.

(Continued).

BY G. C. DRUCE, F.L.S.

POLYGONACEÆ, Lindley.

Rumex, L.

1094. *R. conglomeratus*, Murr. Wet places, road sides, ditches, etc. Common in all the districts. June—August.

1095. *R. nemorosus*, Schrad. Green-veined Dock. Woods and shady places. June—September.

First record, 1879—Journ. Botany.

Nene a, Duston; Nene b, Yardley Chase, Delapre, etc.; Nene c, Wakerley Wood; Ouse, Whittlebury Forest, Deanshanger, Wicken Wood.

The red-veined variety *R. sanguineus*, Koch, is reported from Castle Ashby pond-side by Miss Brent.

1096. *Rumex maritimus*, L. Golden Dock. Dyke sides. Rare and local. July—September.

First record—Ray's *Historia Plantarum*, 1686.

Welland, Crowland (Ray's Hist.); Nene c, "*Lapathum authoxanthon* (J. B.), on banks of the Caer dyke nigh Paxton and elsewhere here in the fens" (Morton's Hist.)

It still occurs sparingly by the North bank dyke, near Peterboro'. See Journ. Bot., 1879, and Report of Record Club, 1879.

1097. *Rumex pulcher*, L. Fiddle Dock. Road sides, waste ground, churchyards, etc. July—September.

First record—Baker's History, 1822.

Nene a, Upton, Badby (Baker), Castle Hill (J. Anderson in New Bot. Guide, 1835), Boro' Hill (Notcutt), between St. James' End and Harlestone, nearly opposite Dallington Park gates, etc.; Nene b, Rothwell Churchyard, Higham Ferrers ditto, Addington ditto, Weekley; Nene c, Peterboro' (Paley).

1099. *Rumex obtusifolius*, Auct. *R. Friesii*, G. & G. Road sides, waste places, pastures, etc. June—September.

Common and generally distributed.

1100. *R. pratensis*, M. & K. *R. acutus*, L. Road sides. Rare, but probably overlooked.

First record, 1860—Paley, Marholm Wood, found between Wakerley and Duddington, in 1884. It is probably a hybrid of *crispus* and *obtusifolius*.

1102. *R. crispus*, L. Common Dock. Road sides, cultivated grounds. Abundant in all the districts, and a great pest of the farmers. On stiff soils.

As its roots are very tenacious, and a large quantity of seeds are produced, mowing does not eradicate it, which can only be accomplished by stubbing up the roots; the plants should then be burned, but the local practice is to collect them in bundles which are thrown into the nearest ditch, where the plants soon establish themselves.

Swift says—

“My love for gentle Dermot faster grows
Than yon tall Dock, that rises to thy nose;
Cut down the Dock, 'twill rise again; but know
Love rooted out, again will never grow.”

The roots of the Dock are very astringent, and are stated to possess antiscorbutic properties. Attempts have recently been made to bring it again into medical notice.

Mr. French noticed a ‘grainless form’ at Grimsbury.

1104. *R. hydrolapathum*, Huds. Water Dock. River sides. Not uncommon. July—September.

First record—T. Beesley, 1841.

Cherwell, near Banbury bridge, rare (T. Beesley), near Kings’ Sutton and Twyford (T. Beesley); Ouse, Yardley Gobion, Old Stratford, Cosgrove, Stoke Bruerne; Nene b, Cogenhoe, Denford, etc. (W. Lewin); Nene c, Peterboro’ (Paley), Wansford, very fine.

Occasionally this plant is found with the leaves somewhat cordate, but the fruit of the only one I saw ripe enough to examine did not vary from the type.

1107. *R. acetosa*, L. Common Sorrel. Meadows, pastures, road sides, etc. Abundant in all the districts.

First record—Wm. Pitt, 1797, “Meadows below Northampton.”

The pleasant acidity of the leaves is owing to the presence of an oxalate of potassium. The plant has been used as a salad, etc., from very distant times.

1108. *R. acetosella*, L. Sheep’s Sorrel. Dry pastures and heathy places. Locally common. May—August.

First record—Notcutt, 1845.

Cherwell, near Kings’ Sutton, Canon’s Ashby, etc.; Avon, Honey Hill; Ouse, Cosgrove; Nene a, Boro’ Hill and Daventry Wood (Notcutt), Danes’ Camp, Harlestone, Kingsthorpe, Badby Downs, Farthingstone, Litchboro’,

etc. ; Nene b, Mears Ashby, Cogenhoe, etc. ; Nene c, Peterboro' (Paley), Wittering, etc. ; Welland, Pilsgate, etc.

POLYGONUM, L.

1110. *P. fagopyrum*, L. Buck Wheat. Woods, etc. An introduction, scarcely naturalised.

Cogenhoe Iron Quarries (Rogers), near Warkworth (French), Harlestone Firs.

1111. *P. convolvulus*, L. Black Bindweed. Hedges, cultivated ground. Generally distributed. July—September.

First record—Notcutt, 1845.

Cherwell, Grimsbury (French), Kingsutton ; Avon, Elkington ; Ouse, Puxley, Coppice Moor, etc. ; Nene a, Dallington, Harlestone, Roade, Moulton Park, etc. ; Nene b, Overstone (Mrs. Birch), Great Billing, etc. ; Nene c, Peterboro' (Paley), Thornhaugh, etc. ; Welland, Ufford, Barnack.

Var. *pseudo dumetorum* has been noticed at Duston, Houghton, etc.

1113 *P. aviculare*, L. Knot-grass. Road sides, waste places, cultivated fields, etc. Abundant in all the districts.

The varieties have not been carefully studied, but *agrestinum* has been noticed at Duston, Yardley Gobion, etc. ; *vulgatum* Roade, Harlestone, etc. ; *arenastrum* Vigo, Houghton, etc. ; *rurivagum* Wakerley, Potterspury.

1116. *P. hydropiper*, L. Water Pepper. Wet places, ditches, damp woods, river sides, etc. August—September.

First record—Notcutt, 1845.

Cherwell, near Banbury (French), Aynhoe ; Nene a, Boro' Hill (Notcutt), Harlestone Firs, Brampton, Northampton Canal side, Baulmsholme Meadow, Badby, Farthingstone Castle Dyke ; Nene b, Denford, Boughton Park ; Nene c, Peterboro' (Paley), Sutton ; Welland, Fineshade.

1117. *P. minus*, Huds. Wet places. Rare.

First record—Baker's History, 1822.

Nene a, Brampton, Dallington, and Duston (Baker) ; Nene c, Peterboro' (H. C. Watson, Top. Bot.)

1118. *P. mite*, Schrad. Ditch sides and wet places. Local.

First record—H. C. Watson, *Cybele Britannica*, 1847-1859.

Nene c, Peterboro' (H. C. Watson as above), side of North Bank Dyke.

1119. *P. persicaria*, L. Willow Herb. Wet places, cultivated ground, etc. July—October.

First record—W. Pitt, 1797, "in damp arable fields, locally called Willow Herb."

Common throughout the county.

Var. *biforme*, Wahl. Kingsthorpe rail side.

1120. *P. lapathifolium*, L. Cultivated ground, waste places, etc.

Common. July—October.

First record—Notcutt, 1845.

Cherwell, Kings' Sutton, Thorpe Mandeville (Rogers); Avon, Staverton Wood (Notcutt); Ouse, Furtho', etc.; Nene a, Boro' Hill (Notcutt), Dallington, Milton, etc.; Nene b, Overstone (Mrs. Birch), Sewage Works abundant; Nene c, Peterboro' (Paley), Dyke sides abundant.

1121. *P. maculatum*, Trimen & Dyer. Ditch sides, etc. Local.

First record—The Author Journ. Bot., 1879.

Common on mud recently thrown out of dykes below Peterboro'; dense and lax flowered forms noticed.

1122. *P. amphibium*, L. Ditches, ponds, rivers, and wet places.

Common. July—September.

First record—Paley, 1860.

Cherwell, Mill Meadow (French), Kings' Sutton; Avon, Yelvertoft; Ouse, Wakefield Ponds, Tove, Cosgrove, etc.; Nene a, Drayton Reservoir, Fawsley, Nene, etc.; Nene b, Boughton Park, Houghton, etc., Castle Ashby (Rogers); Nene c, Peterboro' (Paley), Whitewater (Jones), Fotheringhay, etc.; Welland, Rockingham.

Var. *terrestre*. Mill Meadow (French), Cherwell side near Aynhoe; Ouse, Canal side Cogrove; Nene a, Drayton Reservoir, Gayton, etc.

1123. *Polygonum bistorta*, L. Great Bistort. Wet meadows. Local and rare. May—August.

First record—Morton's Hist., 1712. *Bistorta major*.

Ouse, in meadows near the Ouse not far from Cosgrove (Morton); Nene a, Dodford (R. Botfield), Badby Meadows (Notcutt), Duston (Baker), Dallington (Baker), Meadows St. James' End; Nene c, Apethorpe (Rev. M. J. Berkeley).



THE UPPER LIAS OF NORTHAMPTONSHIRE.

BY B. THOMPSON, F.C.S., F.G.S.

Part II.

THE PAPER-SHALES WITH FISH AND INSECT LIMESTONE.

THE lowest recognised beds of the Upper Lias in Northamptonshire consist of finely laminated shales, called the *Paper-shales*, with a single band of limestone called the *Fish and Insect-bed*; both the shales and the limestone being well identified by the abundant fragmentary remains of small fish which they contain. Insect remains are very rare in the limestone bed in this county; nevertheless they are abundant in some places, and so I have thought it advisable to retain the name "*Fish and Insect limestone*," although *Fish-bed* simply might be more appropriate so far as Northamptonshire is concerned, as indeed it is the one by which it is most often called.

The PAPER-SHALES are finely laminated shales having a very regular and clean cleavage. They vary in colour from dirty slate to dull yellow, and when freshly exposed to the desiccating influence of a dry atmosphere the layers will at times spontaneously separate from each other at the edges, and exhibit a tendency to curl up like a piece of paper held before the fire. The cut edges, too, look very much like the ends of an unbound book. These shales are not well developed in Northamptonshire, indeed I have only identified them two or three times, though Prof. Judd frequently records their occurrence in a district not very far north of that in which I have been working. At Milton, in a field situated about three miles from Northampton, there may be seen a ridge which indicates the furthest extension of a marlstone quarry worked many years ago for road metal. The section is almost completely obscured by grass, but round the part of the field which has been worked over there are indications of the *Fish-bed* and *Paper-shales*. Some few months ago Mr. Billing, of Rothersthorpe, who occupies the land, very kindly gave Mr. W. D. Crick and myself permission to make a section, and with the help of a man with a pick and spade we got a fairly good cut down to the *Rock-bed*. The Paper-shales here are found just above and below the Fish-bed, but are only a few inches in thickness altogether; they consist of a soft yellowish or reddish shale easily splitting into thin laminæ, the exposed surfaces of which exhibit the same fragmentary fish remains that are so characteristic of the harder and more

persistent Fish-bed that is intercalated with them ; indeed the weathered portions of the Fish-bed are scarcely distinguishable from this shale in hard specimens. The doubt which I at first felt as to whether these shales were the true Paper-shales, or only weathered portions of the Fish-bed, led me to compare them with the thicker deposit in Rutlandshire described by Prof. Judd as the Paper-shales, and their identity was strikingly apparent. An after exposure of these shales at Milton village, in sinking a well for a brewery there, further satisfied me that they were the same as the typical Paper-shales of Gloucestershire, although very much diminished in thickness. The Paper-shales at Alderton and Dumbleton in Gloucestershire have a thickness of 15 feet, and abound in flattened specimens or impressions of ammonites of the *falcifer* group, many with their aptychi, and these I did not find in Northamptonshire until recently. In Somersetshire the bed is not so thick as in Gloucestershire, and rather different in character, though Moore recognises them as the same ; also they have yielded a remarkable and abundant suite of fossils ; the flattened ammonites of Gloucestershire are present, but also a number of fossils not found elsewhere in this country. The genus *Leptæna*, which was supposed to have become extinct in Palæozoic times, is represented by several species and a large number of specimens, and on this account the beds were named the *Leptæna clays* by the late Mr. C. Moore, who so ably worked them out (1).

Above the Transition bed, and below the Paper-shales where these are present, or between the Transition bed and the Fish-bed where the shales are absent, there is in many places in this county a thin bed of yellow sandy clay (see sections), which Mr. Beesley (2) some years ago called doubtfully the *Leptæna bed*, since it occupied just the position of Moore's *Leptæna* beds in the West of England. It seems probable that it is not, however, for it is singularly deficient in fossils. Once only, near to Warden Grange, have we found a few fossils in it, and these were identical with Transition-bed ones. A large specimen of *Placurotomaria araneosa* was found in this clay at Watford, but it was resting on the Transition bed, and so probably belonged to the latter. With these slight facts, and in the absence of any positive evidence of its belonging to the Upper Lias, I have preferred to follow Mr. E. A. Walford in regarding it as belonging to the Transition period.

Returning to the Paper-shales, I may say that on first seeing them turned up from a depth of about 15 feet, at Milton, I was surprised with the great resemblance they bore to the Gloucestershire ones, a resemblance which, after a careful examination, I found to extend to the fossils ; the flattened ammonites and aptychi, although rare, were present. I thought it

(1). "On the Middle and Upper Lias of the South-West of England," by Charles Moore, F.G.S.

(2). "Sketch of the Geology of the Neighbourhood of Banbury," by Mr. T. Beesley, F.G.S.

might be interesting to know why the weathered specimens from the two localities here referred to differed so much in appearance, so I heated a few fragments of each in a platinum dish, and the results are given below :— The Alderton shale broke up with sharp detonations, pieces of it flying about in all directions, it then charred, and afterwards gave off white fumes having the disagreeable odour of burning organic matter ; the fumes took fire and burned with a bright flame, after which the contents of the dish smelt strongly of sulphurous anhydride (the odour of burning sulphur). With the Milton specimens there was no crackling, but the pieces charred, gave off some fumes, which however did not burn, and at the end there was a very strong odour of burning sulphur. I next treated pieces of each with dilute hydrochloric acid, and tested the solutions so obtained for iron. With the Alderton specimens there was no apparent action on adding hydrochloric acid, nevertheless the solution showed the presence of iron in considerable quantity. The Milton specimens effervesced considerably with acid from the presence of carbonate of lime, and much iron was present in the solution. I had previously noticed that the Gloucestershire specimens were much more impervious to water than the Milton ones. It appears, therefore, that the particular specimen I had from Gloucestershire differed from the Northamptonshire ones in having much more organic matter and less lime, and in being less pervious to water. These differences in composition are quite sufficient to account for the different appearances of the shales in superficial beds. The sulphurous anhydride was probably formed by the action of organic matter on sulphates in the shale, as there was no indication of the presence of metallic sulphides. The carbonized Milton specimen yielded a little sulphuretted hydrogen on treatment with dilute sulphuric acid, Alderton one not. The yellowish weathered shales did not blacken much on heating, nor did they give off sulphurous anhydride, results which were of course anticipated.

THE FISH AND INSECT LIMESTONE in this county consists of a single band of limestone (3) or limestone nodules, containing, as a rule, abundant remains of fish in a fragmentary condition. The stone usually has characters which would enable a geologist to identify it independently of its fossil contents or position in a section. The common form is that of flattish or lenticular nodules of argillaceous limestone, yellowish or white on the exterior, and bluish grey, light brown, or yellowish inside, according to the amount of weathering they have undergone. It is a fine grained stone, and will generally split into fairly thin plates, although it cannot be relied upon to do so until after exposure to atmospheric influences for some time. Where the stone is thin—say an inch to two inches in thickness—the

(3). There is more than one bed in Rutland, according to Prof. Judd, but I have never found more than one in Northamptonshire.

interior is generally of a light brown colour, differing very slightly from the exterior, the weathering having extended right through, and in these light coloured pieces may be seen a large number of nearly parallel striations, the striæ being almost microscopic; the stone does not seem to split along or parallel to these any better than transversely. The striæ look like, and probably are minute cracks in the stone filled in with crystallized carbonate of lime, though why they should be all in one direction I cannot say. They resist weathering better than the stone itself, and so may be found standing out in strong relief at times. The Fish-bed at Alderton, Gloucestershire, shows the same fine transverse striations.

In larger or denser blocks of the Fish-bed the interior is generally of a darker colour, a dark grey as it is at Watford, or violet coloured as it is at Byfield and around there. Near Watford the Fish-bed is very hard in places, the fragmentary remains being most abundant and well preserved. When the hard pieces are struck or broken they give out a distinctly fetid odour. The weathered surfaces at Watford are very white, more so than I have seen them anywhere else in the county, indeed in most places they are distinctly reddish, or dirty yellow, and quite soft on the exterior.

The nodular or lenticular form of the Fish-bed was probably produced by the cracking of the bed in various directions consequent upon contraction, the cracks going right through, and the subsequent degradation of the joints and surfaces by water. That this is the true explanation is pretty evident because if the cracks had not gone right through the stone they would in all probability have been filled in with calcareous matter, and so formed a septarian mass similar in character to many of the larger nodules from the Lias. The nodules could not have been rolled because they are so regular in position; also the upper surface is almost always more convex than the lower, a result which might be expected from the explanation of their formation given above; further, they are not concretionary, the horizontal stratification is perfectly distinct in all the nodules, showing that each must have been a portion of a continuous bed.

The distribution of the *Fish and Insect limestone* is fairly regular throughout the county, being usually met with a little above the Rock-bed. In the south-western part of the county it is a little fickle in occurrence, and where found it does not so well correspond to the typical form in Gloucestershire as it does nearer Northampton. It retains the character it has near Northampton in the adjoining counties of Rutland and Leicester, but loses it altogether in Lincolnshire. At Lincoln there are two bands of argillo-arenaceous limestone at the base of the Upper Lias which readily split up into large thin laminæ, and these, Mr. Carr (4) thinks, represent the

(4.) "The Lincoln Lias," by W. D. Carr, Esq., in *Geological Magazine*, April, 1883.

Fish and Insect-beds of other districts. I had the pleasure of looking at the Upper Lias sections around Lincoln, in company with Mr. Carr, last spring, and I certainly think it likely that these argillo-arenaceous beds represent some part of the Fish and Insect-beds—probably the Paper-shales; they are very fissile, situated at the base of the Upper Lias, and contain *inoceramus dubius*—a fossil much more common in the Shales and Fish-bed of Northamptonshire and other counties than in any of the higher beds—but no insects, and very few fish fragments.

In Yorkshire there seems to have been a recurrence of the conditions under which the Fish and Insect-beds were deposited in the Midland and South-western counties, for to me it seems quite evident that the lower part of what Messrs. Tate & Blake call the *Jet-rock series*, or *Zone of Ammonites serpentinus*, is the representative of the Paper-shales and Fish and Insect limestone of other districts. I am not aware that anyone has yet pointed out the connection between the sets of beds mentioned above, and so it is necessary for me to justify doing so in this paper. The last bed of the Middle Lias—the Rock-bed—and the Transition-bed, called by Messrs. Tate & Blake the *Zone of Ammonites annulatus*, are both well represented in Yorkshire, and so it is at least probable that the lowest beds of the Upper Lias would be also well developed; and, as a matter of fact, there is a bed of shale, 20 feet thick, resting directly upon the “*annulatus*” shales, which splits up into extremely thin laminæ after exposure to the atmosphere, like the Paper-shales. This shale, when heated, burns with a bright flame like the Gloucestershire shale, and like the latter also chars, and gives out a strong odour of burning sulphur. It is the rock from which jet is almost entirely obtained, and so is called the *Jet-rock*; and it is the similar and similarly situated rock which yields jet in less abundance in the Midland Counties. Above this 20 feet of shale, at Saltwick Nab, south of Whitby, and at other places in Yorkshire, is a solid, continuous, indurated band of hard sulphurous shale, called the “Animal Dogger,” on account of the fish remains it contains; this no doubt represents the Fish and Insect limestone of other districts. The Palæontology of these two beds is strikingly confirmatory of the other evidence of their contemporaneity with the Fish and Insect beds, except in the matter of the insects, which appear to be absent; thus, quoting from Messrs. Tate & Blake’s Yorkshire Lias :—*Inoceramus dubius* is the most abundant and characteristic fossil, *flattened ammonites* with their *aptychi*, and cephalopods allied to the present *Loligo* or the *Sepia*, are met with here and nowhere else in the Yorkshire Lias. All the fishes, too, are peculiar to this bed, and belong to the genera *Pachycormus*, *Ptycholepis*, *Leptolepis*, and *Gyrosteus*, two of which at least are peculiar to the beds further south. *Euomphalus minutus*, too, which is a very characteristic fossil of the beds described in this paper, is described as existing in great

profusion in the limestone-doggers of the Jet-rock. In fact most of the fossils which Messrs. Tate & Blake say are peculiar to this zone in Yorkshire are just those which are peculiar to the Fish and Insect beds further south.

Before describing the sections in Northamptonshire where the Fish and Insect beds may be examined, I will give two from the West of England, which may be regarded as types of the lowest beds of the Upper Lias.

SECTION OF UPPER LIAS AT ILMINSTER, SOMERSETSHIRE (Moore).

				ft.	in.
Yellow Sands of Inferior Oolite (<i>Upper Lias</i> ?)—					
Ammonite Beds	...	...	...	8	0
Saurian and Fish-bed	...	...	...	0	8
Leptæna clays...	...	...	...	1	6

SECTION AT DUMBLETON, GLOUCESTERSHIRE (Moore).

				ft.	in.
Clay and vegetable soil	...	...	...	2	0
Saurian and Fish-bed	...	...	...	1	0
Leptæna clays...	...	...	...	15	0
Marlstone	...	...	...	6	0

The Dumbleton section is the one from which the Rev. P. B. Brodie first obtained the Fish and Insect remains from which the bed gets its name. The section is now covered up, I believe, but a nearly identical one may be seen on another side of the same hill, overlooking ALDERTON, and below I give a copy of my notes made there in the summer of 1883. The thicknesses given are only approximate.

SECTION AT ALDERTON HILL, NEAR DUMBLETON, GLOUCESTERSHIRE.

				ft.	in.
Upper Lias.	1.	Soil, clay and shale, with rubbly limestone, not easily got at to measure	...	10	0
	2.	<i>Fish-bed</i> , consisting of nodular, lens-shaped masses of nearly white limestone, which split easily in the plane of stratification. Many fossils, <i>fish</i> and <i>insect</i> remains chiefly. <i>Euomphalus minutus</i> (<i>Natica pilula</i>) abundant	...	0	6
	3.	<i>Paper-shales</i> . Extremely shaley clay, the plates into which it splits being very thin, and the cut edges looking like the ends of a book. <i>Ammonites of the falcifer group</i> very abundant, many with their <i>aptychi</i> , all of the specimens flattened and had to extract or preserve. <i>A few fish remains</i> . <i>Inoceramus dubius</i> fairly abundant	...	16	0
			...		

		ft.	in.
Middle Lias.	4. Bed of clay, very full of <i>Belemnites</i> , seems to have transitional characters, it is at least quite different to the shales above. No belemnites observed in the shales ...	2	0
	5. <i>Rock-bed</i> . A very hard blue rock, reddish at joints only, not much iron in it apparently, containing :— <i>Pecten æquivalvis</i> both large and small, <i>Pecten liasinus</i> , <i>A. spinatus</i> , <i>Rhynchonella tetrahedra</i> , <i>Avicula inæquivalvis</i> , <i>Myacites unioides</i> , <i>Terebratulæ</i> , <i>Limæa acuticosta</i> . etc.		

The following are sections in Northamptonshire :—

SECTION NEAR TO MILTON.

Communis beds.	1. Soil	1	0
	2. Light coloured marl, or marly clay, effervesces considerably with acids, containing the small ammonites (<i>Communis</i> chiefly), which are so abundant and characteristic of the beds just above the cephalopoda bed ..	1	10
Serpentinus beds.	3. <i>Cephalopoda bed</i> . A whitish irregular limestone abounding in Ammonites of the falcifer group, Belemnites, etc., and containing a few fish fragments like the Fish-bed. Most of the pieces seem much water-worn, especially at top, and some show the striations observable in the Fish-bed... ..	0	6
	4. Variable, reddish and white clay, passing into a paper-shale below. The shale containing fish remains	0	6
Fish and Insect beds.	5. <i>Fish-bed</i> . An irregular sandy limestone, mostly in form of lenticular nodules, some of which split easily into thin laminæ, containing :— <i>Fish remains</i> , fairly abundant; <i>Ammonites</i> , all small; <i>Euomphalus minutus</i> , Wood, etc.	0	2 to 4
	6. <i>Paper-shale</i> , containing fish remains	0	1 or 2
Transition beds.	7. <i>Red sandy clay</i> . A light shaley thin band near centre of it	0	10
	8. <i>Transition-bed</i> , mostly hard, containing :— <i>Ammonites acutus</i> , <i>A. Holandrei</i> , <i>A. communis</i> , <i>Cucullæa Munsteri</i> , <i>Lima punctata</i> , <i>Astarte voltzi</i> , <i>Eucyclus concinnus</i> , <i>Waldheimia resupinata</i> , <i>Rhynchonella tetrahedra</i> , etc., etc.		
Middle Lias.	9. <i>Rock-bed</i> .		

The best section I have seen in this county of the zone described in this paper was at Milton village, a few months ago. A well was being sunk at the brewery, and Mr. East very kindly gave Mr. W. D. Crick and myself every facility for examining the strata passed through.

SECTION OF WELL AT MILTON.

			ft.	in.
Communis beds.	{	1. Soil and clay	3	0
		2. Light blue clay, containing numbers of the small ammonites characteristic of Communis zone :— <i>A. bifrons</i> , <i>A. communis</i> , <i>Belemnites</i> , etc. ...	6	0
Serpentinus beds.	{	3. Yellowish or red sandy clay, with irregularly scattered nodules. The bed itself very irregular as though denudation had gone on sometime. The representative of <i>Cephalopoda-bed</i> ...	1 to 1	0 6
		4. Blue clay, darker than 2. No ammonites found, and only one belemnite. A little jet ...	4	6
Fish and Insect beds.	{	5. <i>Fish and Insect-beds</i> — Paper-shales 6in. } Fish remains abundant in all these beds. Fish-bed. Nodular 6in. } Paper-shales 6in. }	1	6
Transi- tion bed	{	6. <i>Transition-bed</i> . Very indifferently represented, and where present it is hard and the fossils poor. <i>A. acutus</i> found.		
		7. <i>Rock-bed of Middle Lias</i> — Hard stone, very black in fissures, blue hearted. Fair number of pebbles. <i>Pecten dentatus</i> , <i>Terebratulæ</i> , etc. ... 2ft. Very ferruginous bed—highly fossiliferous, fossils obtained best from top. <i>Modiola?</i> etc. ... 1ft. Light coloured and soft rock, quite Oolitic in places, containing :— <i>Cardium truncatum</i> , <i>Pecten liasinus</i> , <i>Pholadomya</i> , etc. ... 1ft.	4	0
"Spinatus" zone.	{	8. Dark blue nucaceous clay, getting more sandy towards the bottom. A bed of highly fossiliferous nodules, about 1ft. in clay, containing a few specimens of <i>A. margaritatus</i> ...	10	0
		9. Hard bed, seems to be made up of concretionary and highly fossiliferous nodules. This bed was not passed through.		
"Margaritatus" zone	{			

The upper beds have a dip of 10° W.S.W.

On Ward's farm, near to BUGBROOK, there was a small quarry in the Marlstone, at the top of which some fragments of the Fish-bed were found of the common nodular form. Some very good specimens of the characteristic little gasteropod *Euomphalus minutus* were obtained here. Near to PRESTON CAPES a nodular limestone occurs a little above the rock-bed, the lenticular shape of the nodules leaves little or no doubt that it is the Fish-bed, although the characteristic fossils were not found in it. At BYFIELD the Fish-bed is neither flaggy nor nodular; it is violet-coloured in the interior, and rests directly on the Transition-bed, and these characters it retains down to CHIPPING WARDEN and ASTON-LE-WALL, etc., with a thickness in this neighbourhood of about 3 inches or less. About here too it is at times absent altogether, and not particularly fossiliferous when found. Planulate ammonites are fairly abundant in the Fish-bed at Chipping Warden.

At MIDDLETON CHENEY and THENFORD the Fish-bed has thickened out to 4 inches, and at the latter place certainly takes on more its normal characters. There are several sections of Marlstone at Thenford, but only two in which the Fish-bed is seen. One was described in this Journal, page 287, Vol. I. The bed here is very soft and fissile owing to weathering, and contains nothing recognisable scarcely in the way of fossils; but about a-quarter-of-a-mile west of the village is an old Marlstone quarry (Boucher's Pit) in which the Fish-bed has very much the characters it has at Milton. Below is a section :—

SECTION AT THENFORD.

	ft.	in.
1. Soil, with fragments of limestone, the remains of Cephalopoda bed most likely...	...	1 0
2. Light blue passing down into reddish clay	0 9
3. <i>Fish-bed.</i> Nodular limestone weathering rather white, striated like Milton one, and containing <i>fish remains</i> and many specimens of <i>Euomphalus minutus</i> , <i>Incoramus dubius</i> , etc.	0 2 or 3
4. Red sandy clay. A single ammonite found in it	0 4
5. <i>Rock-bed.</i> A band of ossicles and shells about two feet from top	5 0

A most interesting section for showing the Fish-bed and the beds immediately above and below it is to be found near to WATFORD, on the railway from Northampton to Rugby, where the road from Watford to West Haddon crosses the line. About the middle of the section—vertically—is a hard bed, or what appears to be such at a little distance, but really it is made up of several as shown as follows :—

SECTION NEAR TO WATFORD.

	ft.	in.
1. <i>Cephalopoda-bed</i> . A rather sandy limestone having a purplish interior, containing many fine large specimens of <i>Ammonites serpentinus</i> , a few Planulate ammonites, and a great abundance of small gasteropods, which however can only be detected on the weathered surfaces, and they seem more abundant in the lower part. <i>A. crassus</i> , <i>Ammonites of the falcifer group</i> , several <i>sp.</i> ; <i>Belemnites</i> and <i>phragmacones</i> , <i>Dentalium</i> , <i>Macrodon</i> , <i>Nucula</i> , <i>Rhynchonella sp.?</i> <i>Nerinea</i> , <i>Astarte</i> , <i>Acteonina</i> , <i>Cerithium</i> , <i>Wood</i> , etc. ... 0 6	0	6
2. <i>Shale</i> . Very red in lower part. No fossils detected ... 0 2½	0	2½
3. <i>Fish-bed</i> . Upper part seems very much waterworn. It is not a continuous bed and is semi-nodular in form, containing:— <i>Ammonites</i> , <i>Euomphalus minutus</i> , <i>Fish</i> remains most abundant, <i>Wood</i> , etc. ... 0 3	0	3
4. <i>Red sandy clay</i> , does not seem persistent. One large specimen of <i>Pleurotomaria araneosa</i> came from this but could detect nothing else. No foraminifera ... 0 2½	0	2½
5. <i>Transition-bed and Rock-bed</i> . A rather soft stone having the same reddish mottled appearance so characteristic of it on the Dorsetshire coast. The upper part is very full of <i>gasteropods</i> and small <i>Rhynchonellæ</i> ; it also contains <i>A. acutus</i> , <i>The Falcifer ammonites</i> , <i>belemnites</i> , and a large number of little pebbles, and so probably represents the Transition-bed, but cannot be separated from the bed below. <i>Ammonites communis</i> is met with in the Rock-bed several inches below the surface ... 0 10	0	10

At a depth of about 10 inches from the top the Rock-bed becomes suddenly shaley, bluer, and more like clay further down still, and if this is a part of the Rock-bed, it would give it a thickness of nearly 3 feet. I am inclined to think the shale is one of the lower beds of the Middle Lias, as it is so unlike the Rock-bed anywhere else; it only yielded one or two specimens of *avicula*. In one or two places also there seemed to be an indifferent kind of separation between the hard Rock-bed and the shale below.

The description of the beds given above will only hold good for the particular place where it was taken; in one place, for instance, the Fish-bed rested directly on the Rock-bed or Transition-bed; in others a bed of sandy clay existed between it and the Rock-bed, and in these situations the under part of the Fish-bed seemed composed chiefly of comminuted shells, it how-

ever yielded a number of small Gasteropods (5) and some good sized Belemnites, together with Fish fragments. At another place only about half-an-inch separates the Cephalopoda-bed and Rock-bed, the Fish-bed being absent or merged into one of the others. Near the bridge the Rock-bed, Transition-bed, and Cephalopoda-bed form only one block of stone, though each can be recognised by its fossils.

Against the bridge, at some 10 or 12 feet above the Cephalopoda-bed already described is another hard bed. I could only detect it at this one spot, because in other places the bank is so overgrown with grass, but it has characters quite different to those below. It is oolitic in character, and contains many fragments of small ammonites, as does also the clay immediately below it. These no doubt belong to the Communis-beds.

CONDITIONS OF DEPOSIT.

The Palæontology of the contemporaneous beds, the *Leptæna clays* of Somersetshire, and the *Paper-shales* of Gloucestershire and Northamptonshire; and also of the Fish and Insect limestone itself in these counties respectively is so different that it is difficult to clearly understand the conditions under which they were deposited. The peculiar and unique character of the *Leptæna* clays in Somersetshire, as regards their fossil contents, Mr. Moore does not attempt to explain, but he says of the *Saurian and Fish-bed* (Fish and Insect limestone) :—"Whatever may have been the case with the *Leptæna* clays, that the Saurian and Fish-bed was deposited in an estuary there can be little doubt, since thousands of insects of this remote age were driven from the adjoining land, and settling upon the muddy surface left by the ebbing tide of the surrounding ocean, were entombed, and their remains preserved through succeeding ages to this time, and with them are occasional fruits and vegetables, which point to the same conclusion." The Rev. P. B. Brodie, referring to the West of England deposits, says he thinks that the Mendips formed a near land surface when the Fish and Insect beds were deposited.

It appears to me very probable that all the deposits in the zone we are now considering, except perhaps those in Somersetshire, were littoral ones formed as the dry land of the Middle Lias, after a comparatively brief exposure, gradually became submerged again. I have already in this Journal, Vol. II., page 240, given reasons for believing that some part at least of the rock-bed of the Middle Lias formed dry land at the close of the Middle Lias period, and the occurrence of deposits immediately succeeding it, giving evidence of the comparative nearness of land, seems to confirm the

(5). The Rev. P. B. Brodie, M.A., F.G.S., tells me that he once found the Fish-bed near to Daventry with many small shells, chiefly univalves, in it, so that in all probability the peculiar condition at Watford is continued to Daventry.

idea. It was in the early stages of the depression which followed this land period that the Fish and Insect beds, shales and limestone, were deposited, because the shales below the Fish-bed contain, in many places, a large amount of organic matter, and in some also remains of insects, and they are altogether of such a nature as might be expected from the washing of a land surface covered with a soil on which vegetation was growing. Apart from the fact that similar conditions existed over an area too great for an estuarine explanation to be acceptable, there is no mingling of fresh water and marine forms of life, as far as I know. Some of the beetles found in the south-western counties might have been aquatic, but it appears equally likely they were not. The Fish and Insect limestone, considered by itself, points to a similar mode of formation, it occurs quite or nearly at the top of the shales, in most places is less mixed with organic matter than they, and was probably formed from material produced by the disintegration of the rock which formed the subsoil of the land surfaces, after the removal of the real soil and vegetation; this rock being the Middle Lias rock-bed in many cases. A shelving and gradually sinking beach, which would allow the tide to encroach a little more on the land at each return, would very well explain the various peculiarities of these beds observed in the counties extending from Gloucestershire to Yorkshire. It would explain the coincidence of considerable thickness in the shales being accompanied by a larger quantity of organic matter (compare Gloucestershire and Yorkshire). It is sufficient to account for the finely laminated condition of the shales, and the accumulation, without dispersion, of vegetable debris, which Messrs. Tate & Blake consider to have been necessary for the formation of those bituminous shales which yield jet; it also explains, perhaps as well as any other theory, the occurrence of insect remains chiefly in the upper bed, the insects having been driven on to a smaller and smaller area of land until at last a wholesale destruction of them occurred. The upper beds of the Middle Lias and a good portion of the Upper Lias are absent in the north of Lincolnshire and south of Yorkshire; may it not be that this district formed a land surface whilst the "*annulatus*" shales and *jet-rock* were forming further north.

From the thinness of the shales and the rarity of insect remains, and also the small amount of organic matter in them, I think Northamptonshire, at the commencement of the Upper Lias period, must have been further removed from large land surfaces than the districts N.E. and S.W. of it.

Mr. Westwood thinks that the climate at the period of these deposits was temperate, or moderately cold, because most of the insects are small, and the lower the temperature of any region the smaller the insects. There may of course be small insects in warm countries, but seldom large ones in a cold country. (6)

(6). See "A History of the Fossil Insects in the Secondary Rocks of England," by the Rev. P. B. Brodie, M.A., F.G.S.

PALÆONTOLOGY OF THE FISH AND INSECT BEDS. (7)

The Palæontology of the Fish and Insect beds is very variable in different places, and everywhere peculiar. In Somersetshire, Saurians are so abundant as to have caused Mr. C. Moore to name the bed corresponding to our Fish and Insect limestone the *Saurian and Fish-bed*, and he says that the nodules often conform so closely to the shape of the enclosed organism as to enable identification before breaking. With us, in Northamptonshire, Saurian remains can scarcely be said to exist.

The *Fish remains* seem about equally abundant in this county and Gloucestershire, but they are nearly all those of a small species of *Leptolepis*. These fish must have existed in vast numbers. Some have been found whole in the stomachs of *Teleosauri* by Mr. Moore. Some larger fish inhabited the seas also at this time—*Pachycormi*, etc.—but they seem, like the Saurians, to have preferred the neighbourhood of what is now Somersetshire. Some fine specimens are in Bath Museum.

The *Insect remains* are chiefly those of the Neuroptera and Coleoptera, but are not, as a rule, so numerous or so perfect as those obtained from the base of the Lower Lias. The remains consist chiefly of *elytra* and *wings*, both however being rare in this county, if indeed present at all. A small fossil, which is probably the pupa of an insect, was found in the Paper-shales at Milton. This is the only insect remain I have thought it advisable to particularly mention, though on several of the slabs of Fish-bed from Milton there seem to be fragments of insects. A fine *Libellulæ* wing, now in Leicester Museum, was found by Mr. Harrison in the Fish-bed on the railway beyond Lutterworth, in Leicestershire; and Prof. Judd several times records insect remains in the Fish-bed of Rutland and Leicester, so it is at least likely that they should occur in Northamptonshire. The insect remains do get rarer the further north we go, and apparently disappear altogether in Lincolnshire and Yorkshire. To those who wish to know more of the insect life of this period, I would refer them to the Rev. P. B. Brodie's classical work on Fossil Insects.

Cephalopods are pretty well represented in Northamptonshire. Most of the ammonites are very small, being either the young or else dwarfed specimens, probably the former, as large ones are occasionally found, indeed are fairly abundant in the Fish-bed at Watford and Byfield. It is quite a peculiarity of these beds that the ammonites are commonly found with their *aptychi* attached. The exact character of the *aptychus* is at present doubtful, though from the fact that it has been found within the outer

(1). Wherever I speak of the *Fish and Insect Beds* in this paper I mean both the Paper-shales and the Limestone bed. Since with us the shales exist both above and below the Limestone bed, it has seemed to me unnecessary and inadvisable to consider the palæontology separately. Most of the fossils, however, came from the Limestone.

chamber of the shell, and from the difficulty of assigning any other useful purpose to it, it is most commonly looked upon as an *operculum*, similar to that of the gasteropods. Aptychi have been described as distinct fossils, under the name *Trigonellites*. The few aptychi I have found in Northamptonshire have been detached. In the shales below the Fish-bed, wherever they are met with, the ammonites are flattened. I believe this condition is to be accounted for by the large amount of organic matter originally composing the bed; this organic matter at first would render the bed very light and porous in character, but as it decomposed it would yield to the pressure of superimposed matter, and so the fossils would become compressed. *Belemnites* are rare, and those found mostly small, but at times accompanied by ink-bag. Naked Cephalopods of the genus *Geotenthis* (Mun.) and *Teudopsis* (Desl.) are found in these beds, and, I believe, no other part of the Lias; they are abundant in Somersetshire. Mr. Moore thinks they were the chief food of the Ichthyosauri of the period. One specimen, probably *Teudopsis*, and an *ink-bag*? of one of these cephalopods are all I can record from Northamptonshire. The *Gasteropods* and the *Conchifera* seem to be fairly well represented in this county, though most of my specimens of the former are minute, and, consequently, somewhat difficult to identify (see list).

LIST OF FOSSILS FROM THE PAPER-SHALES AND FISH AND INSECT
LIMESTONE OF NORTHAMPTONSHIRE.

REPTILIA.

PTERODACTYLE? A small, slender, and apparently hollow bone, half-an-inch long by one-sixteenth broad, from Milton, seems to be referable to the Pterosauria, and if so, I suppose must have belonged to a Pterodactyle.

SAURIAN BONE. Mr. E. A. Walford, F.G.S., records a Saurian rib bone from Byfield, the only one found in the district, I believe, although Saurian remains are so abundant in the same horizon in Somersetshire.

PISCES.

LEPTOLEPIS CONCENTRICUS. Nearly all the fish remains seem referable to this species. It was a small fish, and must have existed in vast numbers, judging by the very common occurrence of remains of it in the Shales and Fish-bed almost everywhere. The remains consist of *heads, gill-plates, vertebræ, scales, etc.* (See plate, figs. 2 and 4). The head figured was found by Mr. W. D. Crick.

PACHYCORDUS. A few fragmentary remains from Milton are referable to this genus.

INSECTA.

PUPA? Milton. Although this is at present a doubtful specimen, I have thought it sufficiently interesting to figure it. (See plate, fig. 5).

CEPHALOPODA.

LYTOCERAS CORNUCOPIA (*Young & Bird*). (See plate, fig. 6). This is probably the *Ammonites nitidus* of Young & Bird, which both Wright and Tate place under the head of *Am. cornucopia*. The fine radii covering the shell spring in pairs very closely connected from the insides of the whorls, diverging slowly and thickening in their course. As the radii cross the back they are well separated, and the fimbriations, which are nowhere conspicuous, fill the interspaces between them. Thicker ribs occur irregularly here and there. The fossil occurs in the Upper Lias Fish-bed at Byfield, where that stratum is but three or four inches above the upper beds of the "*spinatus*" zone. The specimen and note respecting it are from Mr. E. A. Walford, F.G.S.

STEPHANOCERAS COMMUNE (*Sow.*) *Ammonites communis*, *A. angulatus* (*Sow.*) Chipping Warden, Byfield, and Watford.

STEPHANOCERAS HOLANDREI (*D'Orb.*) Milton and Byfield.

*STEPHANOCERAS CRASSUM (*Young & Bird*). *A. Andreæ* (*Simp.*) *A. raquinianus* (*d'Orb.*) Byfield.

HARPOCERAS SERPENTINUM (*Rein.*) *A. falcifer*, or *A. Strangewaysi* (*Sow.*) Chipping Warden and Byfield.

HARPOCERAS SIMILE? (*Simp.*) Milton.

*HARPOCERAS EXARATUM (*Young & Bird*). *A. elegantulus* (*Y. & B.*) Byfield.

*HARPOCERAS ELEGANS (*Sow.*) *A. subplanatus* (*Oppel.*) *A. complanatus* (*d'Orb.*) *A. mulgravius* (*Y. & B., etc.*) Byfield, Chipping Warden, and Aston-le-Wall.

*HARPOCERAS BIFRONS (*Bruguière*). *A. Walcottii* (*Sow.*) *A. hildensis* (*Y. & B.*)

HARPOCERAS LEVISONI (*Simp.*) Milton, Byfield, Chipping Warden, and Watford. This appears to be the commonest ammonite in the Fish-bed of Northamptonshire.

*HARPOCERAS LECTUM (*Simp.*) *A. lympharum* (*Dumort.*) Byfield.

*HARPOCERAS RADIANUS COMPRESSUS (*Quenstedt*). Byfield.

HARPOCERAS ACUTUS (*Tate*). Chipping Warden, Byfield, and Milton.

APTCHUS SP. ? Paper-shales at Milton and Fish-bed at Watford.

BELEMNITES. There are few Belemnites in this zone. I believe I only have one that would admit of identification, and that is probably *B. Ilminsterensis*.

TEUDOPSIS ? Milton.

INK-BAG of one of the Cephalopods. Watford.

GASTEROPODA.

DENTALIUM LIASSICUM (Moore). Watford.

***DENTALIUM ELONGATUM (Münst.)** Byfield.

PLEUROTOMARIA SP. ? Thenford.

TURBO ? Watford. A badly preserved specimen.

NERITOPSIS near to **TRANSVERSA (Moore).** (See plate, fig. 7). Though Moore's (8) figures are not satisfactory, being as he says "restorations," yet his shell seems to have a more excentric spire and to be less rugose than *N. Philea* (d'Orb.), in which features our Northamptonshire specimen is still more distinct. It has no trace of the fine transverse markings characteristic of both d'Orbigny's and Moore's species. The latter Dumortier places under the head of *N. Philea* (d'Orb.) Upper Lias Fish-bed, Byfield.

OPERCULUM OF NERITOPSIS=PELTARION UNILOBATUM (Desl.) (See plate, fig. 8). Dumortier (9) figures and describes this curious body as the operculum of a gasteropod (*Neritopsis*), stating that it has been found in its proper position in the mouth of the shell. The Rev. F. Smythe, D.D., has also at a later date, in the Proceedings of the Cotteswold Club, called attention to similar fossils, and has agreed with Dumortier's definition. Moore had previously classed them with the Chitonidæ and Deslongchamps with the Cephalopoda. Probably the Upper Lias Fish-bed. Byfield.

The specimens and notes respecting these last two are from Mr. E. A. Walford, F.G.S.

***TURRITELLA ANOMALA (Moore).** Byfield.

TURRITELLA ? A highly ornamented shell of which I can find no figure or description. The nearest I can find to it is *Turritella Dunkeri (Terquem.)* Watford.

(8). "On the Middle and Upper Lias of the South-West of England," by C. Moore, F.G.S. Proc. Somersetsh. Arch. and Nat. His. Socy. 1865-6. Taunton.

(9). "Etudes Paleontologiques sur les Depots Jurassiques du Bassin du Rhone par." Eng. Dumortier.—Quartieme Pt., Lias Superieure, p. 133. Paris, 1874.

* Quoted from "On some Middle and Upper Lias Beds in the Neighbourhood of Banbury," by Edwin A. Walford, Proceedings of the Warwickshire Naturalists and Archaeologists' Field Club, 1878.

CERITHIUM CORONATUM (*Moore*). Watford, Byfield, and Chipping Warden.

TROCHUS CARINATUS (*Moore*). Watford.

EUOMPHALUS MINUTUS (*Schübler*). *Natica pilula* (*Tate*). *Natica neglecta* (*Simp.*) *Straparolus minutus* (*d'Orb.*) *Orthostoma naticoides*. This is perhaps the most abundant widely spread fossil to be found in the Fish and Insect-beds, and is very characteristic of them, though not confined to them.

NERINEA LIASSICA (*Moore*). Moore says of this species only one example is known from the Lias. I have one pretty good specimen and two or three indifferent ones from Watford.

LAMELLIBRANCHIATA.

*OSTREA SUBAURICULARIS (*d'Orb.*) Byfield.

OSTREA SP. ? Chipping Warden, Milton, Watford.

*PECTEN PUMILUS (*Lamarck*), *Pecten personatus* (*Zieten & Goldfuss*). Chipping Warden.

PECTEN resembling *P. STRIONATIS* (*Quenst.*) Four or five specimens from the Paper-shales at Milton, none found elsewhere.

PECTEN SP. ? Milton. Can find no figure resembling this.

*PECTEN TEXTORIUS (*Schl.*) Byfield.

AVICULA SP. ? Watford.

ASTARTE PARALLELA ? (*Moore*). Watford.

POSIDONOMYA BRONNII (*Voltz.*) Watford.

INOCERAMUS DUBIUS (*Sowerby*). *Ostrea Saltviciensis*. A very abundant fossil both in the Shales and Fish-bed.

*CEROMYA (VENUS) BOMBAX (*Quenst.*) Byfield.

ECHINODERMATA.

SPINES OF ECHINODERM ? Milton and Watford. The spines occur in the form of long, slender, fluted rods, and may perhaps belong to Hemipedina, or a Cidaris, as the Rev. P. B. Brodie tells me that he has examples of Cidaris entire from Gloucestershire, though very much crushed.

TENTACULAR FRAGMENTS OF ENCRINITE. Watford.

PLANTÆ.

WOOD is rather common, but generally in small pieces.

A little Iron Pyrites was found in the very hard parts of the Fish-bed at Watford.

A few ammonites and gasteropods were either too small or too badly preserved to justify special mention.

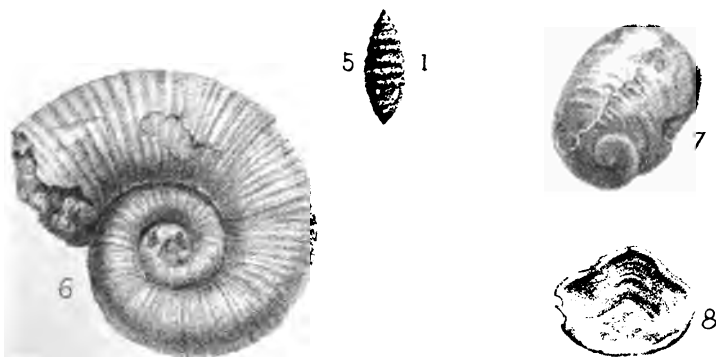
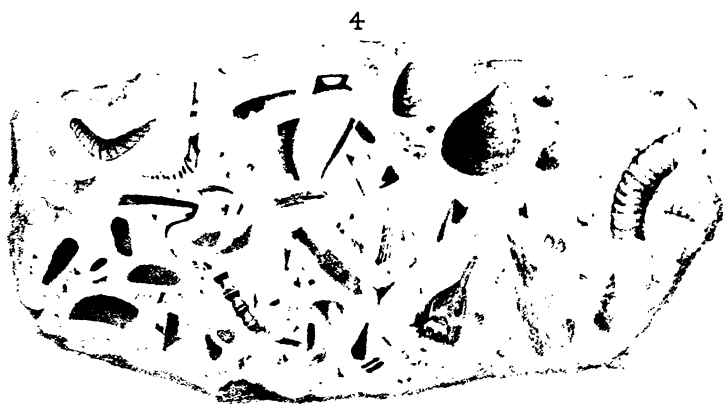
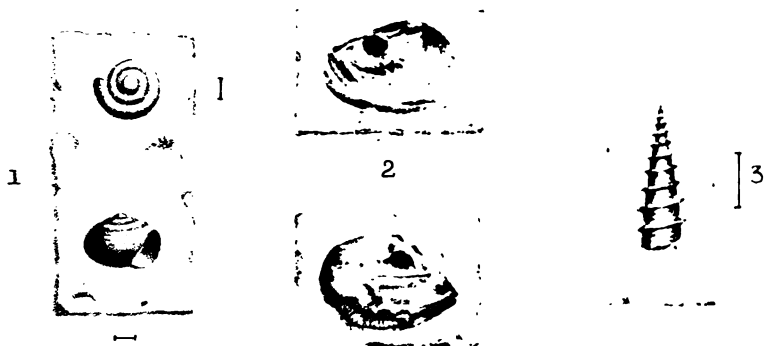
I have to thank the Rev. P. B. Brodie, M.A., F.G.S., and Mr. E. A. Walford, F.G.S., for advice on the Palæontology of the beds described in this paper, and Mr. E. A. Walford and Mr. W. D. Crick, for the loan of specimens for figuring.

DESCRIPTION OF PLATE.

Fig. 1. EUOMPHALUS MINUTUS (*Schübler*).

- „ 2. HEAD OF LEPTOLEPIS. The two figures are of the same head as shown on the separated laminæ of slab.
- „ 3. NERINEA LIASSICA (*Moore*).
- „ 4. SLAB OF FISH AND INSECT-LIMESTONE, showing the condition in which the remains are most commonly met with. *Inoceramus dubius*; *Ammonite*; heads, scales, vertebræ, and gill-plate of *Leptolepis*; etc.
- „ 5. PUPA? (See notes.)
- „ 6. LYTOCERAS CORNUCOPIA (*Young & Bird*).
- „ 7. NERITOPSIS NEAR TO TRANSVERSA (*Moore*).
- „ 8. OPERCULUM OF NERITOPSIS = PELTARION UNILOBATUM (*Desl.*)





SNAILS AND THEIR SHELLS.

"SNAILS ! Ugh ! Nasty slimy things !" — Somebody may exclaim on reading the title of this paper—"Whatever of interest can there be in them." To such a one I would repeat the lines of the poet Wordsworth—

"He who feels contempt
For any living thing, hath faculties
Which he has never used ; thought with him
Is in its infancy."

We possess no privilege to despise the meanest thing which crawls, and undoubtedly we know least of the objects we dislike the most. We should rather distrust ourselves in regarding any living thing as beneath our notice, because, accurately interpreted, it only means an expression of our own ignorance.

Prejudice is a very powerful enemy ; still it must be overcome if we wish to investigate the wonders of nature, and we must ever remember that nothing has been called into existence by the Great Creator, but for some wise end, even though our limited knowledge may fail to discover its utility, and the purpose which it serves in the economy of nature.

It must be admitted that snails and slugs have few personal attractions for strangers, yet they improve upon acquaintance, and I will even venture to assert that whoever will take upon himself the task of investigating them, comprehending their history, and unveiling the mysteries of their existence, will ultimately cease to despise them, and even become their champions. No doubt few of our friends who call them 'nasty soft things,' imagine that in the latter adjective they are applying to them, the same epithet as is conveyed under the Greek word *Mollusca*, which naturalists employ to include them and their kind.

It is not my intention now to enter into a scientific description of their internal structure, but rather to treat of them in a more popular style, gathering up some fragments of the popular folklore connected with them, and noticing their local names, hoping to excite sufficient interest so as to induce other members to devote attention to them.

First, we will pay our respects to the common garden snail (*Helix aspersa*), whose visits to our young lettuces and choice seed beds are often more frequent than pleasant. He is never troubled with that modern worry—house-hunting ; but whenever he wishes for a change of air and scene, he carries his domicile upon his back. His building has no want of curvilinear lines, and is not only weather-proof and water-proof, but is also ornamented

with bands and mosaics, and has its interior floored with enamel. Its drainage is perfect, and its ventilation irreproachable—cool in the summer, and no icy draughts in the winter.

The Gasteropoda—by which name the snails are known among the learned—derived their name from the usual form of the locomotive organ (Greek—Gas-teer, the belly, and pons, a foot, *i.e.* belly-footed), which is so variously developed in the different members of the class.

In the Conchifera or Bivalve Mollusca, the 'foot' is found to be an organ which in some secretes the byssus or anchor-cable, in others bores holes, and yet in others accomplishes jerky movements of the body. In the swan mussel of our rivers this instrument is applied to more regular and definite locomotion, and with the foot they may be seen ploughing their way through the soft mud which falls to the bottom of the stream. In their case, however, the foot is a rounded organ, and at its end is something like the human tongue, both in shape and structure. In the gasteropods, the foot is a flat broad surface, placed along the under side of the body, by means of which the animal can crawl over solid substances. In some of the conchifers the shape of the foot is much more like that of the human foot than in any of the gasteropods; but in function, of course, the foot of the gasteropods is much more like a foot than the same organ in the lower class. Usually the foot is a muscular sheet, broader and longer than the body of the animal, and acts at the same time as the wall of the body, and the means of propelling it along. The whole rim of the foot all the way round is usually thickened and can be closely applied to a smooth surface, while the central parts can be thrown in wrinkles. Thus the whole acts as a kind of sucker or hold-fast, while all the middle parts, being alternately applied to the ground and dragged over it, effect a movement in which the whole animal participates. If you will allow a slug to crawl up a pane of glass, and look at it through the transparent medium, you will see successive waves moving all along the foot, showing that while a series of points are fixed, the parts in between are moving, and the moving parts then become fixed, allowing the previously fixed parts to be pushed or pulled along by the contraction of the muscles embedded in the skin. Such a mode of progression, which may be called piecemeal, is, of course, slow, but it is sure; and how should an animal without limbs move on a solid surface otherwise?

The snail's shell is formed in successive layers, or laminæ, its calcareous and earthy growth proceeding simultaneously with the growth of the animal by sympathetic exudations from the secretive glands of the fleshy neck of the mantle.

The neck (or collar as it is called) of the snails, increasing in growth daily, it is able to push the collar from time to time beyond and outside its original shell margin. In these motions more membranous and calcareous

matter is exuded, which adheres to the shell edge or mouth, and hardens into an additional diagonal line of thatch. The colouring deepens, and gradually becomes more pronounced as line upon line is added daily. It is bound or strapped on the back of the snail by two muscles which unite at the pillar, and, having penetrated the body below the spiral part, trend forward under the stomach.

The fibres having interlaced the 'foot muscles,' on their contraction, the body of the *Helix* is drawn within.

Egress is facilitated by circular fibres which surround the body above the foot, and this motion is aided by the polished surface of the interior, which is formed by an excretion of pure lime. From the nature of this shelly covering, the land snails are very largely influenced in their distribution by the geological character of rocks. Wherever limestone or chalk is the underlying stratum, there they abound, both in individuals and species.

An old shell has a highly-polished lining, from the constant friction of the soft body passing in and out.

When a snail is about a month old, he begins to be prettily ornamented with the tattoo of his species; and by this time the glands on the neck of his mantle are well furnished with the mucous slime and the colours which pervade the pores of the shell and vivify it.

If you will examine any empty garden-snail shell, you will notice that the upper two out of his three whorls have no tattoo marks; they are of a horny hue. This is probably owing to an imperfect development of the liver, and after the snail obtains an increased power in the odontophore, or teeth-cushion saw, strong-flavoured and thicker vegetation is attacked and digested, and thus the exudations are of more marked and decided tints than before.

What may be termed the pattern, is produced by the admixture of the albuminous or white mucous with the dark brown excretions from the larger glands of the collar. There is no perceptible growth in the tattoo marks after their first formation—that is to say no expansion has been traced.

It is a most singular fact that even the baby snails begin to build their houses before they are hatched. Even when yet in the egg, the little creatures are found to have formed a thin shell. This is like infant precocity. One thing, however, seems to be beyond their power, they cannot form the colouring matter of the shell. Their houses are quite transparent and look like so many glass beads, and are not ornamented until the inhabitants have had rather more than a fortnight's life of vagabondage.

The ingenious manner in which the snail repairs a damage to his dwelling is worthy of notice. In a human habitation, if a roof tile is broken

off, one or two artificers, one or more ladders, and one or two days are employed to repair the damage ; but when *Helix aspersa* sustains a fracture or damage in his roof, a nerve telegram is sent from the surface of his mantle to the cerebral ganglia or principal nerve centre, and an order is transmitted simultaneously to the nearest mucous glands in the collar (the thickest part of the body nearest to the shell) to exude the necessary cement. This hardens quickly, being a conglutinating cement, free from animal matter. Eyesight, in our conception of the word, the snail can hardly be said to possess, and so the creature repairs the roof without 'surveying' the damaged spot, or overlooking the progress of reparation, except by the local sensation of comfort or discomfort. For whether the black spots in the hinder pair of horns are eyes is a moot question.

The ease and rapidity with which snails can withdraw their tentacles on the approach of danger is very remarkable. This movement is effected simply by introversion, much the same as an old woman draws her stocking feet into the leg, after mending them. Many may remember the 'luck' which was supposed to be attached to the successful plucker of a snail by the 'horns,' and in the present day a common amusement of children consists in charming snails, in order to induce them to put out their horns, using some rhythmical couplet on the occasion.

In my early days, spent in the neighbourhood of Yardley Chase, I can remember taking the animals up and repeating over them the words—

"Packman, packman, put out your horn,

Or else I'll give you a pepper corn."

Clare alludes to the packman snail in poem on evening—

"'Tis evening ;

The black snail has got on his track,

And gone to his nest is the wren,

And the packman snail, too, with his home on his back,

Clings to the bowed bents like a wen."

Miss Baker, in her "Glossary of Northamptonshire Words and Phrases," says that "Clare is the only authority for its use," but I can certainly state that I have several times heard the term applied to *Helix aspersa*, and indeed can well remember using the appellation myself when a child.

The following I extract from Thistleton Dyer's "English Folklore"—

"The following couplet in the southern counties is repeated by children on the occasion of charming the snails :

'Snail, snail, come out of your hole,

Or else I'll beat you as black as a coal.'"

In the northern counties we find another version, which runs thus :

"Snail, snail, put out your horn,

I'll give you bread and barley corn."

In certain districts of Scotland it is regarded as a token of fine weather, if the snail obeys the command to put out its horn—

“Snailie, snailie, shoot out your horn,
And tell us if it will be bonnie day the morn.”

Snail charms, it may be noticed, are not peculiar to English children, but are found on the continent. Thus for instance, in Silesia, the children are in the habit of singing—

“Snail, snail, slug slow,
To me thy four horns show,
If thou dost not show me thy four
I will throw thee out of the door,
For the crow in the gutter
To eat for bread and butter.”

Dr. Cooke notices a very similar custom which exists in the Eastern counties, where the children hold the snails, chanting to them meanwhile as prognosticators of the weather—

“Dodman, dodman, pull out your horn,
And show 'twill be a good day i' the morn.”

It is said that the creatures have the truly wonderful power of reproducing their horns or feelers, should any accident derive them of these organs. Spallanzani, an Italian naturalist, is even said to have repeatedly cut off the heads of snails, and yet those heads, with all their organs, have been in a few months reproduced. This is indeed a power men may well envy, for all our boasted medical science has not been able to make a new limb grow in the place of one that has been cut off.

It has been observed that snail shells of the same species differ in brilliancy of pattern from various causes. The lesser or greater supply of lime, the more or less prevalence of succulent vegetation, and ample or deficient sunlight decidedly affect the shells. Several pure white shells of *Helix aspersa* have been found by collectors.

It will be well to call attention to the snail's winter-house. When food begins to fail, and the autumn nights get cool, the creature becomes drowsy, and makes up his mind to a long sleep. Some crowd into sheltered corners, and retire deeply into the shell, building up four or five thin walls of lime at the entrance, so forming a tolerably tough and water-proof diaphragm, effectively separating them from the outside world. Many of them are rudely disturbed by the hungry birds, who, discovering the shells, drive their beaks through the walls and devour the inmates.

This species, according to Professor Edward Forbes, is largely eaten in many parts of Greece; and even in this country, ‘quack’ doctors sometimes recommend it, boiled in milk, as a cure for consumption; but the large apple-snail was most generally employed for this purpose.

The Rev. Thistleton Dyer, in his "English Folklore," has an amusing extract from the "Book of Days," on the power which snails were formerly believed to possess in curing coughs. I give it as follows :—Mrs. Delany writes in January, 1758, "Does Mary cough in the night? Two or three snails, boiled in her barley-water, or tea-water, or whatever she drinks, might be of great service to her; taken in time, they have done wonderful cures. She must know nothing of it. They give no manner of taste. It would be best nobody should know it but yourself, and I should imagine six or eight boiled in a quart of water, and strained off and put into a bottle, would be a good way, adding a spoonful or two of that to every liquid she takes; they must be fresh done every two or three days, otherwise they grow too thick."

Observe the care which must be taken that the person is ignorant of the nature of the medicine, which might otherwise render it inefficacious.

Helix aspersa appears to dislike clayey soils, but this is no particular gain, for another common species, *Helix hortensis*, seems to prefer them, and therefore takes its place.

In common with many other terms which are given in Miss Baker's "Glossary" as being applied to snails, whatever may be the precise meaning in other parts of the county, they certainly are used in another sense in the neighbourhood of Yardley Chase. For instance, the term Hod, Dod, which is given as diminutive of Hoddy, Doddy, and being applied to some of the smaller *Helices*, is more generally, at least so far as my experience goes, applied to *Helix aspersa*, though occasionally all snail shells, irrespective of their size, are called Hoddy snails. Clare uses the name Pooty or Pooty snail, for the girdled or striped wood snail shell (*Helix nemoralis*)—

"Bush, dyke, or wood, where painted pooties lay."

In another poem he describes in a clear and beautiful manner the boyish pastime of playing conqueror with these shells (which are also called conger and cogger—both these words may probably be but corruptions of conqueror). The pastime alluded to consists in holding one of these shells between the last joints of the bent fingers, and forcibly pressing the apex, against another held in a similar manner by an opponent, until one of them by the dint of persevering pressure, forces it way into the other, and the one which in these contests has gained the most victories is termed conqueror, and is highly prized by its juvenile owner. Clare's MS. poems, Boys and Spring—

"There's something yet in childhood's ways
On which I love to dwell,
And oft I hunt in spring's first days
The painted pooty shell.
The children crush them nib to nib
Against the meadow brig,

And don't their little tongues run glib
 At running such a rig.
 They call them cocks, and so they fight
 A little cocking day !
 The hardest breaks the whole outright—
 The hero of the day."

Time was when the rustic maiden used to read her fortune in the movements of a snail, which was set to crawl on the hearth, and was thought to mark in the ashes the initials of the lover's name. As these divinations were usually associated with some particular day, so the snail divination was only effectual when performed on May-day.

The practice is thus poetized by Gray :—

" Last May-day fair I searched to find a snail,
 That might my secret lover's name reveal ;
 Upon a gooseberry bush a snail I found,
 For always snails near sweetest fruit abound.
 I seized the vermin ; home I quickly sped,
 And on the hearth the milk-white embers spread ;
 Slow crawled the snail, and, if I right can spell,
 In the soft ashes marked a curious L.
 Oh ! may this wondrous omen lucky prove,
 For L is found in Lubberkin and Love."

ROBT. ROGERS,

Hampton-in-Arden,

Warwickshire.



METEOROLOGICAL REPORT AND OBSERVATIONS, 1884.

OCTOBER.

THE fine weather, which was so prominent a feature during the recent summer, has continued with but little interruption, and another dry month is added to the list. In spite of the fine weather experienced, the mean temperature for the month comes out slightly below the average of former years ; the first part of the month was, however, much colder than the latter part, and of the five weeks the first two were below the average, whilst the last three were in excess. The mean temperature of the month was 48°. The maximum registered was 60° on the 2nd and 3rd, and the minimum registered was 33° on the 13th and 29th. Rain fell on nine days only to the depth of 0·86 in., or 1·50 in. below the average of the last 15 years. The barometer varied from 30·45 ins. on the 4th to 29·25 ins. on the 9th and 28th.

NOVEMBER.

November experienced some fairly cold weather, especially in the latter part of the month ; the first week, however, was abnormally warm, registering as high as 60° in the shade on the 2nd ; the lowest temperature registered was 24° on the night of the 24th. The mean temperature for the month was 41°, or about 2° below the average. The rainfall was very slight, only 1·25 in. falling, or 1·20 in. below the average of the last 15 years. Snow fell on the 25th and 30th. The barometer varied from 29·50 ins. on the 4th and 29th to 30·40 ins. on the 10th and 19th.

DECEMBER.

December opened with the temperature high for the season, the excess was, however, limited to the first two weeks. The mean temperature for the month was 39°, being about the average. The maximum registered 53° on the 7th, and the minimum registered 20° on the night of the 31st. The rainfall was again very light, only 1·60 in. being registered, or 0·43 in. below the average of the last 15 years. Slight snow fell on four days. The variations of the barometer were from 28·70 ins. on the 20th to 30·05 ins. on the 31st.

F. LAW.

METEOROLOGICAL REPORT AND OBSERVATIONS.

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OCTOBER, 1884.

STATION.	OBSERVER.	RAINFALL.				SHADE TEMPERATURE.			
		Total for Month.	Total for Year.	Greatest Fall.	Wet Days.	Maximum.		Minimum.	
				In. Date.		Deg.	Date.	Deg.	Date.
Northampton ..	H. Terry	0.80	14.66	0.31	9	55	17 & 18	34	12
" ..	F. Law	0.86	14.11	0.35	9	60	2 & 3	33	13 & 29
Castle Ashby ..	R. G. Scriven	1.09	16.42	0.60	9	61	1	31	23
Litchborough ..	Ed. Grant	1.39	16.91	0.47	9	63	2	33	10 & 23
Sedgebrook	C. Markham	1.05	15.85	0.34	9	60	7 & 16	33	11 & 13
Rothwell	J. More, M.D.	0.65	12.57	0.15	28	..	..	..	..
Oundle	S. P. Holloway	0.86	13.19	0.19	11	12	..	..	..
Towcester	J. Webb	0.91	14.47	0.41	9	..	..	..	..
Little Houghton ..	J. Brawn	1.13	15.13	0.46	9	54	23	32	11
Fawsley	Lady Knightley	1.07	15.47	0.50	9	57	16	32	10 & 26
Thorpe Manville ..	Seth Barnes	1.82	16.45	0.67	9	..	..	..	..
Floore	E. G. Loder	1.17	..	0.33	10	63	1	31	5
Twywell Rectory ..	Rev. H. Waller	0.93	..	0.24	9	..	..	..	..
Whittlebury	W. S. Miller	1.02	17.04	0.54	9	60	2	28	8
Hazelbeach	Mrs. Albert Pell	1.39	..	0.34	9	35	23	30	11 & 13
Rockingham. Cstl.	H. Wate	1.06	17.16	0.34	9	..	..	..	..
Holdenby	J. Gregory	1.26	19.29	0.36	9	10	..	..	..
Kettering	C. W. Lane	1.05	16.11	0.37	9	63	16	32	11
Peterborough	J. Whitwell	1.07	13.82	0.30	10	63	5 & 18	32	22
Average 18 years ..									
1866-83	H. Terry	2.54	21.97	..	..	..	..	..	..

NOVEMBER.

Northampton ..	H. Terry	1.86	16.02	0.48	30	11	55	2	25	29
" ..	F. Law	1.25	15.26	0.45	30	14	60	2	34	25
Castle Ashby ..	R. G. Scriven	1.73	18.15	0.72	30	12	60	2	24	24
Litchborough ..	Ed. Grant	1.53	18.44	0.60	30	14	59	2	21	29
Sedgebrook	C. Markham	1.37	17.22	0.48	30	16	59	2 & 7	26	25
Rothwell	J. More, M.D.	1.02	13.59	0.37	30	8	..	..	..	..
Oundle	S. P. Holloway	1.18	14.37	0.46	30	11	..	..	..	..
Towcester	J. Webb	1.15	15.62	0.58	30	11	..	..	..	..
Little Houghton ..	J. Brawn	1.13	16.26	0.28	5	13	50	1	25	30
Fawsley	Lady Knightley	0.99	16.46	0.28	30	11	56	2	23	29
Thorpe Manville ..	Seth Barnes	1.61	18.06	0.48	30	8	..	..	..	..
Floore	E. G. Loder	0.79	..	0.25	3	6	53	2	21	30
Twywell Rectory ..	Rev H. Waller	1.19	..	0.50	30	10	..	..	..	..
Whittlebury	W. S. Miller	1.61	18.57	0.53	30	13	59	2	18	29
Hazelbeach	Mrs. Albert Pell .....	..	..	..	..	..	..	..	..	..
Rockingham. Cstl.	H. Wate	1.50	18.66	0.61	30	6	..	..	..	..
Holdenby	J. Gregory	1.20	20.45	0.44	30	14	..	..	..	..
Kettering	C. W. Lane	1.31	17.42	0.57	30	14	58	4	27	30
Peterborough	J. Whitwell	1.39	16.21	0.62	30	10	60	2 & 3	24	29 & 30
Average 18 years ..										
1866-83	H. Terry	2.33	23.20	..	..	..	..	..	..	..

DECEMBER.

Northampton ..	H. Terry	1.80	17.82	0.29	2	16	50	13	20	30
" ..	F. Law	1.60	16.86	0.28	2	16	53	6 & 13	20	30
Castle Ashby ..	R. G. Scriven	2.13	20.28	0.30	2	18	54	7	20	30
Litchborough ..	Ed. Grant	2.62	21.06	0.35	2	19	51	2	22	30
Sedgebrook	C. Markham	1.85	19.07	0.39	2	19	55	13	20	31
Rothwell	J. More, M.D.	1.72	15.31	0.24	2	15	..	..	..	..
Oundle	S. P. Holloway	1.50	15.87	0.22	18	16	..	..	..	..
Towcester	J. Webb	2.38	18.00	0.34	2	16	..	..	..	..
Little Houghton ..	J. Brawn	2.13	18.39	0.34	2	17	49	6	20	31
Fawsley	Lady Knightley	2.03	18.49	0.35	2	17	51	13	22	30
Thorpe Manville ..	eth Barnes	2.34	20.40	0.63	3	16	..	..	..	..
Floore	E. G. Loder	2.63	..	0.50	1	15	52	6	20	31
Twywell Rectory ..	Rev. H. Waller	1.50	..	0.35	19	..	..	..	..	..
Whittlebury	W. S. Miller	2.85	21.42	0.50	7	17	52	13	19	30
Hazelbeach	Mrs. Albert Pell .....	..	..	..	..	..	..	..	..	..
Rockingham. Cstl.	H. Wate	1.77	20.43	0.28	18	11	..	..	..	..
Holdenby	J. Gregory	1.88	22.37	0.38	2	19	..	..	..	..
Kettering	C. W. Lane	2.16	19.58	0.32	18	21	53	13	24	31
Peterborough	J. Whitwell	1.37	16.58	0.21	2	15	56	6	24	31
Average 18 years ..										
1866-83	H. Terry	2.80	26.37	..	..	..	..	..	..	..

HENRY TERRY, SURGEON.

AUTHENTICATED LIST OF THE MOLLUSCA OF NORTHAMPTONSHIRE.

REPRINTED FROM THE JOURNAL OF CONCHOLOGY.

THE following list is a transcript from the record-books of the Conchological Society, and only includes records which have been authenticated (*i.e.*, verified by the submission of specimens to Mr. J. W. Taylor, one of the Society's referees, and in like manner the slugs have been seen and authenticated by Mr. Wm. Denison Roebuck). These records are therefore uniform in value with the other 'authenticated lists' published or to be published, in so far as the elimination of certain obviously possible sources of error is concerned.

The principal materials upon which the following list is based are :—

(1). A collection of shells made by Mr. Thomas W. Bell, M.C.S., of Leeds, in the immediate neighbourhood of Peterborough, which is in the extreme N.E. corner of the county, in the years 1877, 1880, and 1882.

(2). A few shells collected by the Rev. H. H. Slater, M.A., F.Z.S., etc., at Irchester, on the extreme E. border of the county, in the spring of 1884.

(3). A large collection made within a few miles radius of the town of Northampton, by Mr. W. D. Crick, of that place, during the past two or three years.

(4). A small collection from Castle Ashby and Maidford, got together by Mr. R. Rogers, and submitted to Mr. Taylor by Mr. Crick.

(5). Isolated records from other sources, each of which is duly credited to its recorder.

It will be seen on referring to the map of the county that much the greater part of its area is as yet uninvestigated, for a radius of seven miles from their common centre will cover all the localities investigated by Messrs. Slater, Crick, and Rogers, while a radius of three miles will include all those worked by Mr. Bell, which moreover are on the extreme edge of the narrowest end of Northamptonshire.

The number of species and varieties recorded hereafter are as follows :—

Water Shells	30 species and 6 varieties.
Slugs	4 " 2 "
Land Shells	37 " 17 "
Total...	71 25

This enumeration does not include the numerous colour and band mutations of *Helix nemoralis* and *H. hortensis*.

The species whose absence from the enumeration is most conspicuous, and which are therefore the most likely to be added to it by further research, are the following :—

Pisidium, various species.	<i>L. lævis</i>
Anodonta cygnea.	<i>Lehmannia arborum</i> .
Valvata cristata.	<i>Zonites glaber</i> .
Planorbis nitidus.	<i>Z. nitidus</i> .
Ancylus lacustris.	<i>Helix pygmæa</i> .
Amalia marginata.	<i>Vertigo</i> , various species.
<i>Limax flavus</i> .	

The Conchological Society's referees will be happy to have the opportunity of examining and determining any or all of the above. There also seems no reason why *Testacella* should not occur, while *Cyclostoma* has been reported but not confirmed, and *Achatina* and *Acme* should be searched for.

The initials appended to the records are those of T. W. Bell, W. D. Crick, R. Rogers, and H. H. Slater.

LIST.

- Sphærium corneum* (L.)—Peterborough, Eye, and Newborough, T. W. B.; the Little Sea, Far Cotton, Northampton, five sent, W.D.C.; river Nene at St. James' End meadows, two sent, W.D.C.
- Sphærium cornem v. flavescens* (Macgill).—Eye, T. W. B.; Irchester, one, H. H. S.; river Nene at St. James' End meadows, with type, W.D.C.
- Sphærium rivicola* (Leach).—In the canal at Far Cotton, first bridge towards Blisworth, four, W.D.C.
- Sphærium lacustre* (Müll.).—In river Nene at St. James' End meadows, Northampton, one, W.D.C.; pond at Castle Ashby, on duckweed, two, R.R.
- Pisidium pusillum* (Gmel.).—Rejectamenta of river Nene, at St. James' End, Northampton, one, W.D.C.; Castle Ashby, on duckweed in a pond, seven, June, 1880, R.R.
- Unio tumidus* Phil.—River Nene at St. James' End, Northampton, one, W.D.C.; canal near Welton Station, one, W.D.C.; canal at Far Cotton, W.D.C.
- Unio tumidus v. radiata* Colb.—River Nene between Old Sewage Works and Paper Mills, Northampton, two, W.D.C.
- Unio pictorum* (L.).—River Nene between Old Sewage Works and Paper Mills, Northampton, three, W.D.C.; Castle Ashby, one, R.R.

Anodonta anatina (L.)—River Nene between Old Sewage Works and Paper Mills, Northampton, canal near Welton, and canal at Far Cotton, seven, W.D.C.

Anodonta anatina v. radiata Jeff.—River Nene between Old Sewage Works and Paper Mills, Northampton, and in canal, Far Cotton, three, with type, W.D.C.

Dreissena polymorpha (Pall.)—Canal, Far Cotton, near Northampton, plentiful, W.D.C. Mr. Crick informs us that some three or four years ago the canal was diverted by the railway company, and now the stones forming the sides of the new banks are entirely covered with these shells.

Neritina fluviatilis (L.)—River Nene near Northampton, J. W. Wood; plentiful in the canal at Cotton End, Northampton, W.D.C.

Neritina fluviatilis v. trifasciata Colb.—River Nene near Northampton, J. W. Wood.

Paludina contecta (Millet.)—Eye and Newborough near Peterborough, plentiful, 1880, T.W.B.; river Nene at Cow Meadow near Northampton, one dead specimen, W.D.C.; Ponds at Castle Ashby, two, R.R.

Paludina vivipara (L.)—Canal at Cotton End, Northampton, plentiful, W.D.C.

Bythia tentaculata (L.)—Peterborough, Newborough. and Eye, T.W.B.; plentiful in the brooks connected with the river Nene near Northampton, W.D.C.

Bythia Leachii (Shepp.)—Newborough near Peterborough, T.W.B.

Valvata piscinalis (Müll.)—Newborough near Peterborough, T.W.B.

Planorbis nautilus (L.)—Pond at Castle Ashby, two, R.R.

Planorbis albus Müll. Pond at Castle Ashby, two, with last, R.R.; Peterborough, T.W.B.

Planorbis spirorbis Müll.—Rejectamenta of the river Nene at St. James' End, Northampton, three, W.D.C.

Planorbis vortex (L.)—Peterborough, Eye, and Newborough, T.W.B.; Little Sea, Far Cotton, Northampton, five, W.D.C.

Planorbis carinatus Müll.—River Nene at Northampton, W.D.C.; canal at Far Cotton, four, W.D.C.; Eye and Newborough, T.W.B.

Planorbis complanatus (L.)—Peterborough, Newborough, and Eye, T.W.B.; river Nene at St. James' End, Northampton, two, W.D.C.

Planorbis corneus (L.)—Pond in Hardingstone Fields, Northampton, two, W.D.C.; canal reservoir at Braunston, four, W.D.C.; Peterborough, Eye, and Newborough, T.W.B.

Planorbis contortus (L.)—Peterborough and Eye, T.W.B.; rejectamenta of river Nene at St. James' End, Northampton, one, W.D.C.

Physa fontinalis (L.)—Newborough and Eye, T.W.B.; plentiful in the brooks connected with the river Nene near Northampton, W.D.C.

- Physa hypnorum* (L.)—Plentiful after a flood in a pool by the side of the road to Beasley's Mill, St. James' End, Northampton, Feb., 1882, the locality is now destroyed by the filling up of the pool, W.D.C.
- Limnæa peregra* (Müll.)—Peterborough, Eye, and Newborough, T.W.B.; brook crossing the Kettering Road at Kingsley Park, W.D.C.; Little Sea, at Far Cotton, Northampton, three, W.D.C.
- Limnæa peregra* v. *ovata* Drap.—Canal at Far Cotton, Northampton, five, W.D.C.; canal at Blisworth, two, large examples, W.D.C.; ponds at Castle Ashby, six, R.R.
- Limnæa peregra* v. *intermedia* Fer.—Peterborough, 1882, T.W.B.
- Limnæa auricularia* (L.)—Newborough, T.W.B.; canal at Blisworth, W.D.C.; canal at Far Cotton, five, W.D.C.
- Limnæa stagnalis* (L.)—Canal at Blisworth, two, W.D.C.; canal (one) and Little Sea (seven) at Far Cotton, W.D.C.; Peterborough, Newborough, and Eye, T.W.B.
- Limnæa palustris* (Müll.)—Newborough, T.W.B.; Little Sea at Far Cotton, seven, W.D.C.
- Limnæa truncatula* (Müll.)—St. James' End Meadows at Northampton, three, W.D.C.
- Ancylus fluviatilis* v. *albida* Jeff.—Canal at Blisworth, twelve, W.D.C.
- Arion ater* (L.)—Weedon, Aug. 16th, 1883, very plentiful there, and widely distributed round Northampton, W.D.C.
- Arion hortensis* Fer. v. *fasciata* [= type].—Wood near Northampton, among dead damp leaves, W.D.C.; garden, 7, Alfred street, Northampton, three, Sep. 1884, small, with yellow foot-sole, W.D.C.
- Limax maximus* L.—Gardens, Northampton, May, 1883, W.D.C.
- Limax maximus* v. *subunicolor* Roeb.—One, found in a cellar in the town of Northampton, W.D.C., Sep. 1884. This was an enormous specimen, measuring 185 millimetres or nearly 8 inches long when only crawling leisurely; at full stretch it would no doubt attain over 8 inches; the specimen contracted in spirit is fully 5 inches long, and the largest slug we ever saw.
- Limax agrestis* L. *typica* Less. & Poll. ('*cinereus immaculatus*.')—Northampton, numerous in gardens, Sept., 1884, W.D.C.
- Limax agrestis* v. *sylvatica* Drap.—Northampton, one, with the type, Sep., 1884, W.D.C.
- Succinea putris* (L.)—Peterborough, Newborough, and Eye, T.W.B.; meadows by brook-side, Gipsy Lane, Northampton, three, W.D.C.; St. James' End Meadow, ten, W.D.C.; canal side at Blisworth, twelve, W.D.C.
- Succinea elegans* Risso.—Peterborough, Eye, and Newborough, T.W.B.

- Vitrina pellucida* Müll. — Milton near Peterborough, T. W. B. ;
Campion's Wood, Kettering Road, Northampton, six, W.D.C. ; spinney opposite the Queen's Cross, Northampton, in moss, one, W.D.C.
- Zonites cellarius* (Müll.)—Castor, Milton, and Eye, near Peterborough, T.W.B. ; Irchester, several, H.H.S. ; Blisworth stone quarry, under stones, two, W.D.C. ; Danes' Camp, near Northampton, in moss, three, W.D.C. ; garden at 27, Green Street, Northampton, under stones, two, W.D.C.
- Zonites cellarius* v. *albinos* Moq.—Wood-pit at Stivington, near Wansford Station, W.D.C.
- Zonites alliarius* (Miller).—Danes' Camp, near Northampton, in moss, one, W.D.C.
- Zonites nitidulus* (Drap.)—Wood-pit at Stivington, four, W.D.C. ; spinney opposite Queen's Cross, Northampton, one, W.D.C. ; garden at Green Street, Northampton, one, W.D.C. ; Campion's Spinney, Kettering Road, Northampton, nine, W.D.C. ; Milton and Eye near Peterborough, T.W.B.
- Zonites purus* (Alder.)—Spinney opposite Queen's Cross, Northampton, nine of this and its variety, W.D.C.
- Zonites purus* v. *margaritacea* Jeff.—With the type.
- Zonites radiatulus* (Alder).—Campion's Spinney, two, W.D.C.
- Zonites crystallinus* (Müll.)—Milton near Peterborough, T.W.B. ; Campion's Spinney, Northampton, two, W.D.C. ; spinney opposite Queen's Cross, seventeen, W.D.C.
- Zonites fulvus* (Müll.)—Campion's Spinney near Northampton, two, W.D.C. ; wall near Moulton Park, one, W.D.C. ; Milton near Peterborough, T.W.B.
- Helix aculeata* Müll.—Eye near Peterborough, T.W.B. ; spinney opposite the Queen's Cross, Northampton, several found, one sent, W.D.C.
- Helix aspersa* Müll.—Peterborough, Eastfield, Eye, etc., T.W.B. ; Northampton town, abundant, W.D.C. ; Towcester, Oct., 1876, J. Maddison ; garden at Green Street, Northampton, five, W.D.C. ; Castle Ashby, common, R.R.
- Helix nemoralis* L.—Towcester, J. Madison ; Peterborough, Eye, Newark, Thorpe, Castor, and Ailsworth, T.W.B.
- H. nemoralis* v. *albolabiata* Von. Mart.—Eye, T.W.B.
- H. nemoralis* v. *hyalozonata* Taylor.—Peterborough and Eye, T.W.B.
- H. nemoralis* v. *rubella* 12345.—Northampton, one (bands very pale), W.D.C. ; Castle Ashby, three (one with bands very pale brown), R.R. ; Northampton, two (ground-colour, very pale), W.D.C.
- H. nemoralis* v. *rubella* 1(23)45.—Castle Ashby, one (with bands pale and blotchy), R.R.

- H. nemoralis* v. *rubella* 123(45).—Castle Ashby, one (ground colour very pale, bands very pale brown), R.R.
- H. nemoralis* v. *rubella* 1(23)(45).—Irchester, one immature (bands interrupted or blotchy), H.H.S.
- H. nemoralis* v. *rubella* 02345.—Immediate neighbourhood of Northampton, two (bands pale), W.D.C.
- H. nemoralis* v. *rubella* 00300.—Northampton, two, W.D.C. ; Castle Ashby, one, R.R. ; Maidford, two, R.R.
- H. nemoralis* v. *rubella* 00000.—Castle Ashby, two, R.R. ; Northampton, two, W.D.C. ; Irchester, one (ground colour very bright red), H.H.S.
- H. nemoralis* v. *libellula* (12345).—Castle Ashby, two, R.R. ; Irchester, one, H.H.S.
- H. nemoralis* v. *libellula* 1(23)(45).—Castle Ashby, one, R.R.
- H. nemoralis* v. *libellula* (123)45.—Castle Ashby, one, immature, R.R.
- H. nemoralis* v. *libellula* (12)345.—Castle Ashby, one, R.R.
- H. nemoralis* v. *libellula* 123(45).—Castle Ashby, one, R.R.
- H. nemoralis* v. *libellula* 1(23)45.—Maidford, two, R.R. ; Castle Ashby, three, R.R. ; Irchester, one, immature, H.H.S.
- H. nemoralis* v. *libellula* 12345.—Castle Ashby, one (bands pale-brown and blotchy), R.R. ; Maidford, two, R.R. ; Castle Ashby, three, R.R. ; Northampton, four, W.D.C. ; Irchester, one, immature, H.H.S.
- H. nemoralis* v. *libellula* 00300.—Castle Ashby, one, R.R. ; Queen's Cross Road, Northampton, two, W.D.C.
- H. nemoralis* v. *libellula* 00000.—Castle Ashby, three, R.R. ; Northampton, one, W.D.C. ; Irchester, one, H.H.S.
- Helix hortensis* Müll.—Eye, Peterborough, Thorpe, and Newark, T.W.B.
- H. hortensis* v. *arenicola* Macgill.—Peterborough and Eye, T.W.B.
- H. hortensis* v. *roseolabiata* Taylor.—Thorpe, Eye, Dogsthorp, and Eastfield, all near Peterborough, T.W.B.
- H. hortensis* v. *incarnata* 00000.—Canal bank near Blisworth, one, W.D.C. ; Duston Road, Northampton, two, W.D.C.
- H. hortensis* v. *lutea* 00000.—Canal bank near Blisworth end of tunnel, fourteen, W.D.C.
- H. hortensis* v. *lutea* 10345.—Canal bank near Blisworth, four, W.D.C.
- H. hortensis* *lutea* 10345 *arenicola*.—Canal bank near Blisworth, one (bands tinged with brown at the mouth), W.D.C.
- H. hortensis* v. *lutea* 12345.—Northampton, four (bands pale in two, somewhat cloudy in one, light brown and blotchy in one), W.D.C. ; Canal bank near Blisworth, eleven, W.D.C. ; Northampton, three, W.D.C.

- H. hortensis* v. *lutea* 12345 *roseolabiata*.—Canal bank near Blisworth, three, W.D.C.
- H. hortensis* v. *lutea* (12)345.—Northampton, one, W.D.C.
- H. hortensis* v. *lutea* 1(23)45.—Canal bank near Blisworth, one, immature, W.D.C.
- H. hortensis* v. *lutea* 123(45).—Canal bank near Blisworth, one, immature, W.D.C.
- Helix arbustorum* L.—Eye, Newark, Peterborough, Thorpe, Milton, and Ailsworth, T.W.B.; Midland railway bank at Cow Meadow, Northampton, one, W.D.C.; Culworth, Aug. 5, 1880, one, R.R.
- H. arbustorum* v. *marmorata* Taylor.—Ailsworth near Peterborough, T.W.B.
- H. arbustorum* v. *pallida* Taylor.—Ailsworth near Peterborough, T.W.B.
- H. arbustorum* v. *flavescens* Moq.—Ailsworth and Eye, T.W.B.
- Helix Cantiana* Mont.—Castor and Ailsworth near Peterborough, T.W.B.; Midland railway bank near Souldrop (on the Bedfordshire border), six, W.D.C.; Canal bank, Blisworth, near the tunnel, eighteen, W.D.C.; Castle Ashby, four, R.R.
- H. Cantiana* v. *albida* Taylor.—Kingscliffe, four, immature, small and very white, on the bare face of a railway cutting, geological formation Great Oolite, C. T. Musson.
- Helix rufescens* Penn.—Eye, Thorpe, Castor, Ailsworth, and Peterborough, T.W.B.; Irchester, plentiful, H.H.S.; canal bank, Blisworth, three, W.D.C.; stone quarry at Wootton, eighteen, W.D.C.; garden at Green Street, Northampton, ten, W.D.C.; wood-pit at Stivington near Wansford Station, five, W.D.C.; Castle Ashby, eight, R.R.
- H. rufescens* v. *minor* Jeff.—Newborough and Eye, T.W.B.
- H. rufescens* v. *rubens* Moq.—Irchester, one, with type, H.H.S.
- H. rufescens* v. *alba* Moq.—Ailsworth, T.W.B.
- Helix concinna* Jeff.—The gardens of Holdenby House, twenty-eight, W.D.C.; brick-pit at Kingsthorpe Hollow, under stones, eleven, W.D.C.
- Helix hispida* L.—Eye, Thorpe, Milton, Castor, Newborough, all near Peterborough, T.W.B.; Irchester, a few, H.H.S.; wood-pit at Stivington near Wansford Station, eight, W.D.C.
- Helix sericea* Müll.—Newborough and Eye, both near Peterborough, T.W.B.
- Helix virgata* Da Costa.—Thorpe, Milton, Ailsworth, Dogthorp, all near Peterborough, T.W.B.; canal bank and stone quarry at Blisworth, twelve, W.D.C.; canal bank at Banbury Lane near Blisworth, three, W.D.C.; field near Harlestone Firs, Northampton, eight, W.D.C.; 'quarry field' near Milton, four, W.D.C.; Castle Ashby, seven, R.R.

- H. virgata* v. *alba* Taylor.—Dogthorp near Peterborough, T.W.B.
- Helix caperata* Mont.—Eye, Castor, both near Peterborough, T.W.B.; stone-quarry at Blisworth, five, W.D.C.; wood-pit at Stivington, nine, W.D.C.; Hop Ground Spinney at Castle Ashby, one, R.R.
- H. caperata* v. *major* Jeff.—Eye near Peterborough, T.W.B.
- H. caperata* v. *ornata* Pic.—Wood-pit at Stivington, with type, W.D.C.
- Helix ericetorum* Müll.—Newark, Eye, and Newborough, all near Peterborough, T.W.B.; Wootton stone-quarry, three, W.D.C.; Milton quarry-field, six, W.D.C.; Blisworth stone-quarry, plentiful, W.D.C.; Irchester, one, H.H.S.
- H. ericetorum* v. *minor* Moq.—Milton quarry-field, with the type, W.D.C.
- H. ericetorum* v. *alba* Charp.—Green's Norton, H. Nelson; Blisworth stone-quarry, with type, W.D.C.
- Helix rotundata* Müll.—Eye near Peterborough, T.W.B.; Irchester, several, H.H.S.; wood-pit at Stivington, seven, W.D.C.; gardens of Holdenby House, eighteen, W.D.C.; brick-pit, Kingsthorpe Hollow, eight, W.D.C.; Champion's Spinney, on the Kettering Road, Northampton, three, W.D.C.; Castle Ashby, two, R.R.
- Helix rupestris* Drap.—Milton near Peterborough, T.W.B.
- Helix pulchella* Müll.—Eye and Newborough, T.W.B.; wall near Moulton Park, one, W.D.C.; ant-hills, Blisworth stone-quarry, seventeen, W.D.C.
- H. pulchella* v. *costata* Müll.—Ant-hills, Blisworth stone-quarry, with the type, W.D.C.
- Helix lapicida* L.—Castle Ashby, lime-tree, December, 1878, one, R.R.
- Bulimus obscuris* (Müll.)—Wood-pits at Stivington, six, W.D.C.; Shittlewell Pit, Gipsy Lane, Northampton, one, W.D.C.; Castle Ashby, under stones, four, R.R.
- Pupa umbilicata* Drap.—Eye, T.W.B.; Irchester vicarage-garden, a few, H.H.S.
- Pupa marginata* Drap.—Eye, T.W.B.; Irchester vicarage-garden, one, H.H.S.; ant-hills at Blisworth stone-quarry, ten, W.D.C.; wood-pit, Stivington, four, W.D.C.; near Moulton Park, a quantity from a moss-covered wall, W.D.C.; Castle Ashby, one, R.R.
- Vertigo pygmæa* (Drap.)—Castle Ashby, one, R.R.
- Vertigo edentula* (Drap.)—Champion's Spinney, on the Kettering Road, Northampton, one, W.D.C.; Castle Ashby, two, R.R.
- Balea perversa* (L.)—On elm trees in avenue leading to Champion's Spinney, twenty-three, W.D.C.; near Moulton Park, from a moss-covered wall, twenty-five, W.D.C.; Castle Ashby, two, R.R.

- Clausilia rugosa* (Drap.)—Milton, near Peterborough, T.W.B. ; Irchester vicarage-garden, abundant, H.H.S. ; Midland railway-bank, opposite Souldrop, Beds., one, W.D.C. ; wood-pit, Stivington, forty-six, W.D.C. ; Castle Ashby, several, R.R.
- Clausilia laminata* (Mont.)—Castle Ashby, five, R.R. ; near Moulton Park, on wall and on neighbouring elm trees, twenty-nine, W.D.C.
- C. laminata* v. *albinos* Moq.—Near Moulton Park, with type, four, W.D.C.
- Cochlicopa lubrica* (Müll.)—Eye, near Peterborough, T.W.B. ; Irchester vicarage-garden, a few, H.H.S. ; Campion's Spinney, two, W.D.C. ; rejectamenta of River Nene at St. James' End, three, W.D.C. ; Spinney opposite Queen's Cross, seven, W.D.C. ; Castle Ashby, four, R.R.
- C. lubrica* v. *lubricoides* Fer.—Eye, near Peterborough, T.W.B.
- Carychium minimum* Müll.—Eye, near Peterborough, T.W.B. ; Spinney opposite Queen's Cross, seven, W.D.C. ; Campion's Spinney, thirteen, W.D.C.

[This List will be followed in the next number by "Notes and Addenda,"
by Mr. W. D. Crick.—EDITORS.]





KIRBY HALL.

NORTHAMPTONSHIRE NATURAL HISTORY SOCIETY & FIELD CLUB.

No 22. May, 1885.

THE FLORA OF NORTHAMPTONSHIRE.

(Continued).

BY G. C. DRUCE, F.L.S.

THYMELACEÆ.

1126. *Daphne Laureola*, L. Spurge Laurel. Native. Hedges and thickets, on clayey soil. Local. March—April.

First record—Laureola with fasciated branches in Dingley, by Mr. Bland—Morton's Hist., 1712.

Cherwell, Thenford (T. Beesley); Ouse, Greatworth (A. French), Potterspury, Cosgrove, Grafton Regis, Helmdon, etc.; Nene a, Harlestone (Miss Baker), Salcey, Plain Woods, etc.; Nene b, Foxhall (W. Lewin), between Hardingstone and Great Houghton (H. N. Dixon), Castle Ashby (Rogers), Wollaston (common), Higham Ferrers, Rushton, Kettering (Lewin); Nene c, Peterboro' (Paley), Barnwell (J. Bodger), Wittering; Welland, Fineshade, now nearly eradicated by herbalists (Rev. M. J. Berkeley).

Thesium humifusum, D. E., should be looked for about Wittering, Collyweston, and Wappenham; at present it is unrecorded for the county.

Aristolochia clematitis, L., is said to have been found by Mr. Weston about Boughton.

EUPHORBIACEÆ.

1132. *Buxus sempervirens*, L. The Box-tree occurs as a planted shrub throughout the county; it has no claims to indigenuity. In Milton woods it is almost naturalized.

1133. *Euphorbia helioscopia*, L. Sun Spurge. Native? Arable fields and garden ground. Common. June—Oct.

First record—Notcutt, 1845.

Cherwell, Kingsutton; Avon, Barby (Trott); Ouse, Yardley Gobion, etc.; Nene a, Drayton (Notcutt), Moulton Park, Danes' Camp, Pattishall; Nene b, Billing, Great Houghton, Wellingboro'; Nene c, Peterboro' (Paley); Wittering, Eye; Welland, Burleigh.

1135. *Euphorbia platyphylla*, Koch. Colonist. Cornfields. Local and rare. June—Sept.

First record—*Tithymalus segetum long*, Ray—Morton's History, 1712.

Ouse, in Cosgrove Field (Morton); Nene a, on the borders of Oxendon Field (Morton); Nene c, Apethorpe and Thornhaugh, light soil (Rev. M. J. Berkeley), Thorpe near Peterboro' (H. C. Watson)—see Cybele Brit.

There are no recent records. I have been unable to meet with it.

1138. *Euphorbia amygdaloides*, L. Wood Spurge. Native. Woods. Local. May—June.

First record — *Tithymalus characias amygdaloides*, Ger.—Morton's History, 1712—copiously in Sulehay woods.

Nene a, Litchborough; absent from the woods round Northampton; Nene c, Kingscliffe (Lewin), Sulehay (Morton), Peterboro' (Paley), Bedford Purlieu, Wakerley woods; Welland, Fineshade (Lewin), between Easton and Kingscliffe (W. H. Jones).

It is absent from a great part of the Ouse district, but it may occur in the upper portion of it about Brackley.

1143. *Euphorbia peplus*, L. Petty Spurge. Colonist. Cultivated ground. Common throughout the county. July—Oct.

First record—Notcutt, 1845.

Cherwell, Aynhoe, etc.; Avon, Barby (H. W. Trott); Ouse, Yardley Gobion; Nene a, Dallington, etc.; Nene b, Delapre, etc.; Nene c, Peterborough, etc.; Welland, Barnack, Stamford, etc.

1144. *Euphorbia exigua*, L. Dwarf Spurge. Native? Arable ground, road sides. Locally common. June—Oct.

First record—Notcutt.

Cherwell, Croughton; Avon, Staverton (Notcutt), Barby (Trott); Ouse, Puckley, Furtho'; Nene a, Harleston, Danes' Camp, Gayton; Nene b, Irthlingboro'; Nene c, Peterboro' (Paley), Wakerley; Welland, Barnack, Burleigh, Helpstone.

More frequent on calcareous soil. The acute-leaved form was seen about Wittering; it is a very variable plant.

1145. *Euphorbia Lathyris*, L. Caper Spurge. Denizen. Woods on calcareous soil. Local.

First record—W. Lewin, 1866.

Nene c, Bedford Purlieu, Wakerley woods, wild in both places and seeding—see Journ. Bot., 1884; Welland, Fineshade (Lewin).

This plant is usually considered to be a 'garden straggler' or alien in England. Babington in the manual says "it is truly wild in a few stony and rocky woods where it appears for two or three years after the bushes have been cut." This very well describes its condition in Northamptonshire.

1146. *Mercurialis perennis*, L. Herb Mercury. Native. Woods and old hedgerows. Abundant in these situations throughout the county. March—May.

First record—Wm. Pitt, 1797—Abundant between Kingscliffe and Wansford.

Cherwell, Warkworth (French), Charwelton; Avon, Barby (Trott), Winwick, Elkington; Ouse, Alderton, Whittlebury, Potterspury; Nene a, Dallington, Harleston, Plain woods, Badby, etc.; Nene b, Delapre. Cogenhoe, Yardley Chase; Nene c, Milton woods, Bedford Purlieus, etc.; Welland, Pilsgate, Thorpe Lubbenham, Sibbertoft, etc.

1147. *Mercurialis annua*, L. Cultivated ground. Rare.

First and only record—Ploughed fields at Kingscliffe (W. Lewin), about 1860.

CERATOPHYLLACEÆ.

Ceratophyllum aquaticum, E. B3. Native. Ponds and small streams. Local.

First record—*Millefolium aquaticum equisetifol*, Raii.—*Nyne nigh Peterboro'* (Morton), 1712.

Cherwell, in the river near Banbury (T. Beesley), Twyford (French); Ouse, Furtho' farm pond; Nene a, St. James' End in the river, Fawsley; Nene b, Boughton ponds, Castle Ashby, Yardley Hastings (Rogers).

Var. *submersum* occurred at St. James' End.

Var. *demersum* at Furtho'.

PHENOMENON OBSERVED AT SEDGEBROOKE.

On the 21st of February last the morning was bright and fine, the sky was clear, and the air perfectly calm; the barometer stood at 29·84 inches and the thermometer 21° Far., the air being saturated.

The vapour from the 7.19 down train remained in the valley and hung like a broad ribbon for fully 18 minutes before it disappeared. The vapour took the form of a stratus cloud and not a cumulus as it generally does.

The railway here runs nearly due north, therefore the very slight motion of the air from the north only moved the cloud slowly up the line. The height of the cloud being forty or fifty feet.

It is very unusual for the vapour from a locomotive to remain stationary for anything like twenty minutes; and do not remember to have ever seen it remain before in this way.

C. A. MARKHAM.

March 31st, 1885.

THE FORMATION, DISTRIBUTION, AND MEASUREMENT OF RAIN.

RAIN is produced by the chilling of air more or less charged with moisture. This may be effected in various ways, of which the following are the principal :—

First.—The ascent of a current of damp air into the colder regions of the atmosphere.

Second.—The contact of warm and damp air with the colder surface of the ground, as in the case of our own west coast in winter, where the land is colder than the sea surface.

The first of these is the most efficacious, and the process is almost always in action in the torrid zone.

The second mode of production of rain is that to which most of the rain which falls on our own west coasts is due. If we look at any rain map of the globe we shall see that all the continents in the temperate zone have wet coasts to the westward, but their west coasts are also far more mountainous than their east coasts. Now, although the land is colder than the sea surface, it is only the very lowest stratum of air which can be chilled by actual contact with the ground. It is undeniable that the westerly winds bring moisture to the coast, a portion of which is deposited in the form of rain as they pass inland ; but, as the coast is mountainous, and the air is forced to ascend, the previously-described mode of condensation comes into play, producing the drenching rains so common on the seaward slopes of our western hills. In this way the climate of our western shores in winter is rendered very mild, owing to the abundance of latent heat set free by the continual condensation of vapour.

I have already mentioned two of the great agencies which are efficacious in bringing about precipitation of moisture—the ascending currents and the contact of warm air with the cool surface of the ground. I must now mention another chief factor which influences the distribution of rain, viz., wind.

Winds moving from high to low latitudes are generally dry ; those moving in the opposite direction are generally damp. Winds blowing from off the shore on to the sea-surface, especially if the coast be bold and the land elevated so that the wind is forced to descend, are essentially dry, while winds blowing from the sea deposit their moisture on the coast.

The south-east trade wind, itself essentially dry at sea, becomes a rain bringer to the mountains of eastern Brazil, and even to the eastern slopes of the Andes. For this reason, that the winds in low latitudes are easterly, the eastern sides of tropical ranges are often better watered and wooded than the western, the reverse of what is the experience in the temperate zone.

The average rainfall of this country varies very considerably ; the eastern parts of England, including London, has a rainfall rather under 25 inches ; and then as we travel westward, and especially when we come to mountainous districts, the amount doubles and trebles until in a few isolated localities it becomes over 75 inches.

In 1883, I find that the variations over the British Isles were from 19·20 inches at Rochester in Kent, to 147·68 inches at Scathwaite in Cumberland.

Last year, in this county, the rainfall varied from 15·31 inches at Rothwell, and 15·87 inches at Oundle, in the eastern part of the county, to 21·42 inches at Whittlebury, and 22·37 inches at Holdenby, in the western district.

The average rainfall in this town for the last 15 years is 25·90 inches. Last year was exceptionally dry—one of the dryest known—the rainfall registering only 16·86 inches, or 9 inches below the average, which represents a deficiency of water to the extent of 581,760 tons, or 130,308,480 gallons to the square mile.

The measurement of rain is obtained by means of a gauge, the funnel of which is made of zinc or brass, and generally either 5 inches or 8 inches in diameter ; the rain is conducted from the funnel by a pipe into a glass bottle or other receptacle, which is emptied every morning at 9 o'clock into a glass measure marked every hundredth-of-an-inch, according to the diameter of the funnel, and the exact depth of the fall is registered.

The measures are graduated to show, and the amount of rain is always spoken of as, the depth it would have been over the area of the funnel, *i.e.*, the depth to which it would have covered the ground had none percolated, evaporated, or run away.

The forecasts in the daily papers of impending Atlantic storms, which play so important a part in the rainfall of this country, are certainly worthy the consideration of all, especially if attention is paid to the state of the barometer, the direction of the wind, and to the following—as regards the Midland counties. As a rule, the forecasts which state a storm will arrive on the North British and Norwegian coasts, or is crossing the Atlantic north of 38° or 40°, will not pass over this district, but when British and French coasts are mentioned, rain with more or less violence, accompanied by strong winds, may be expected, as the following observations go to prove.

During 1884, nine of these storms were predicted to arrive on the British and French coasts, eight of which passed over this town ; and out of fourteen storms predicted to arrive on the North British and Norwegian coasts during the same period, only three affected this town in the slightest degree. During January and February of the present year, seven storms were predicted to pass over the British and French coasts, six of which were recorded in this town.

F. LAW.

A NEW SPECIES OF CATHARINEA Ehrhart,
(= ATRICHUM P. Beauvois).

By H. N. DIXON, M.A.

DESCRIPTION. In small tufts; dark green. *Rhizome* tomentose. *Stems* erect, simple, about 1 inch high, naked below.

Leaves lax below, rather crowded above; slightly sheathing, concave, keeled; erecto-patent when moist, crisped when dry. Lowest small, scale-like, ovate, apiculate, entire; the rest increasing in size upwards, at first shorter and spatulato-oblong, above narrower and elongato-lanceolate, tapering to a point; not undulate. *Nerve* reddish, excurrent into a short but decided apiculus, toothed at the back above. *Leaves not bordered*, with a single row of sharp brownish teeth, commencing at about one-third from the base; not spinulose at the back. *Cells* larger and more regularly quadrate than in *C. undulata*, quadrate below, quadrato-hexagonal above and rounded, especially towards the apex and margin; arranged in longitudinal rows in the disc of the leaf, more irregular and smaller towards the margin; chlorophyllous above, hyaline below. *Lamellae* numerous, crowded; varying much in number, sometimes as many as 32; occupying much of the breadth of the leaf, especially towards the apex; in section of from 3 to 5 almost equal cells.

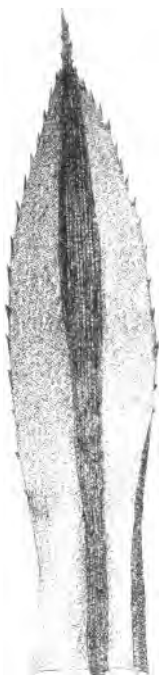
Fructification unknown.

HABITAT. On earth, on and about the roots of elms, near Northampton. First found by the writer, April 3rd, 1884.

This moss has been submitted to Dr. Braithwaite, who has been kind enough to inform the writer that he intends to name it *Catharinea Dixoni*.

It will be observed from the description that it differs from all known species of *Catharinea* except *Atrichum parallelum* Mitt. (described in Journ. of Linn. Soc., Vol. viii., p. 48, tab. viii.; and in Lesquereux, Mosses of North America, p. 258), in the absence of border to the leaves; and from all known species in the large number of lamellae. Whether these two points are sufficient to separate it from *Catharinea* is a question that must be left undecided in absence of fruit; but the habit and general leaf-structure are distinctly those of that genus. For the present Ehrhart's definition must be widened with regard to those points, so as to include these two species.

EXPLANATION OF THE PLATE 1. Leaf, X 15. 2. Lower leaf, X 15. 3. Scale-like leaf from bottom of stem, X 15. 4. Transverse section of leaf, showing lamellae, X 100. 5. Apex of leaf, X 75. 6. Portion of margin of leaf, X 200.



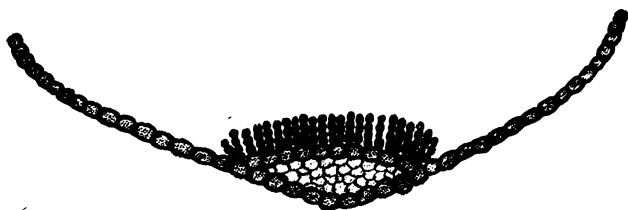
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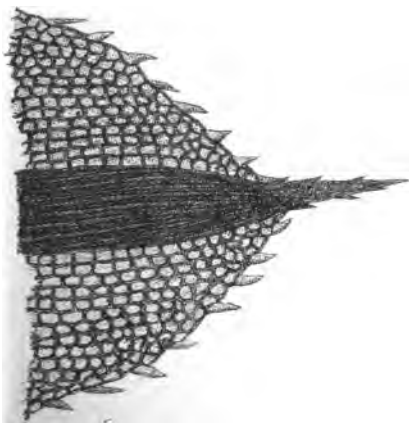
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del. H. N. Dixon.

NOTES ON THE BIRDS OF NORTHAMPTONSHIRE.

BY LORD LILFORD, F.L.S.

110. RING-DOVE OR WOOD-PIGEON. *Columba palumbus*.

To some at least of our readers we feel sure that the first of the above designations, as applied to the well-known subject of this article, will be a surprise, as the term Ring-Dove is very generally applied to the small fawn-coloured Dove with black collar (*Turtur risorius*), so commonly kept in a domestic state in this country, but not an indigenous British Bird: we have, however, ancient authority for so calling the present species. We have a good number of Wood-Pigeons breeding every year with us, about an average number, perhaps, for an English non-coniferous district; but in a good season for beech-mast and acorns we are generally visited by many hundreds, occasionally by thousands, of these birds from the north and east on their southward migration, about the second or third week of October. The stay of these travellers seems to depend upon the supply of the above-mentioned food, and of course on the weather; a few days of severe frost and snow drives them off to the southward, and although during a continuance of such weather we may be visited by an occasional passing flight of these Pigeons, they seldom linger for more than a few days. Our native Wood-Pigeons seldom entirely leave their birthplace; though the southward migration carries off more or less of them, *some* always remain, and feed, apparently principally, at our bean-stacks and on the scanty turnip-tops left by the penned sheep. In open weather few vegetable productions come amiss to the Wood-Pigeon, and we fear that this bird cannot be ranked otherwise than as purely detrimental to the agriculturist. The capacity of the Wood-Pigeon's crop is marvellous, the thin and delicate membrane of which it is formed seems to stretch like a sheet of india-rubber. The Rev. John Holdich, of Bulwick, has supplied me with a note from his Journal, dated December 2, 1837, to the following effect:—"Payne, the keeper at Dingley, lately killed a Wood-Pigeon in Brampton Wood, which had in its crop six dozen (72) acorns; he strung them, and made a string of about 4 feet long." We have ourselves taken 87 beans and a few fragments of turnip-tops from the crop of one of these Pigeons which we killed as it came to roost in one of our plantations some years ago, and have found at various seasons, besides the food above mentioned, wheat, barley, oats, peas, beech-mast, ivy-berries, haws, yew-berries, the pulp of turnips, beet root and mangold, young clover-leaves and seed, and a small onion-like

bulb of which we do not know the correct name. We hold the flesh of this species in high estimation for the table, and our county affords but little better real sport than Wood-pigeon shooting ; for, as every one knows, this bird, though very tame and familiar in the nesting-season, is one of the wariest of animals at other times, and he who wishes to make a bag of these Pigeons between October and March must have all his wits about him, and "shoot straight" and quickly. There is, of course, no art in waiting well concealed and shooting the birds as they settle to roost on trees or to feed upon the ground ; but though this method of slaughter has its attractions, the real "cream" of shooting is to select a comparatively open spot in a wood or plantation frequented by Wood-Pigeons in the morning, and kill or try to kill them as they dash over the tree-tops. My friend Mr. HUNT, of Wadenhoe, has brought the shooting of wild Pigeons in this neighbourhood to the rank of a science, of which he is a most highly accomplished professor, and from his constant residence at Wadenhoe, his rapid and accurate insight of the habits of birds, his activity, and "straight powder" has, during the last few years, destroyed very large numbers of these excellent birds ; on one evening in March, about three years ago, he killed seventy Wood-Pigeons in about two hours, all on the wing, over one of our plantations, and some forty in the same way near the same spot on the following day. At certain times of the year many Pigeons may be decoyed on their favourite feeding-grounds by "stales" *i.e.* wooden or stuffed Pigeons, and Mr. Hunt has most successfully introduced and carried out this method in this neighbourhood. It appears to us that the Wood-Pigeon, in the long days of August at all events, has three regular feeding times, *viz.* :—an hour after daylight, from noon till about 2 P.M., and again in the late evening ; hereabouts they give a decided preference to fields of peas and barley, and by concealing one's self amongst these crops, or in the line of flight from the woods thereunto, great execution may sometimes be done, especially at the beginning of harvest before the crops are carried : a few of the wooden decoys above mentioned, judiciously placed in conspicuous positions upon stooks and on the mown stubble, will generally draw the Pigeons and afford very pretty shooting ; it is a remarkable fact that many more old birds are thus killed than young. In hot weather many Wood-Pigeons may be shot at and about their drinking-places ; but at the ponds in the pasture-land we find that the horses, sheep, and horned cattle will invariably knock down the stales, and much time is lost in driving off these thirsty and inquisitive beasts. The Wood-Pigeon often has eggs in the first week of April, and generally rears three, sometimes four, broods in the year. We have once or twice put one of these birds off her eggs in March, and often in October. The nest and eggs are probably too well known to my readers to require description. The nests are built, to use a somewhat vague but expressive

phrase, "almost anywhere," high and low, well concealed, and conspicuous to every passer, in thin-limbed beeches, dense spruce-firs, ivy, hawthorns, pollard willows, brambles, in fact no boughs or twigs that will support the simple platform of sticks seem to come amiss to these birds ; and we have several times found their nests built upon old ones of other species, such as Thrushes, Blackbirds, and Jays, besides the abandoned dreys of the squirrel. If taken young enough from the nest, the Wood-Pigeon will become very tame—indeed, we once had one sent to us from Spain whose familiarity amounted to impudence ; he would settle on the heads of his human friends, and peck vigorously at them if not taken notice of, and attack any dog which came in our room ; but utterly declined to act as a decoy to his wild relations, as, on being pegged down on the ground with a stout tether, he would at once squat close, and remain as little conspicuous as the locality allowed. We have met this species in every part of Europe which we have visited ; many are taken on their passage over the passes of the Pyrenees by means of hanging nets, into which they are driven by means of a wooden imitation of the Goshawk whirled with a long string in the air as the Pigeons come up the mountain's side. In this neighbourhood, as we have previously mentioned in these notes, many Wood-Pigeons are killed by Sparrow-Hawks, and the Peregrine Falcon is also a deadly foe ; they have another enemy in our squirrels, who play havoc with their eggs and callow young.

111.—STOCK-DOVE. *Columba oenas*.

This bird, which is generally known hereabouts as Rock-dove, is always more or less common with us during the spring and summer, but the great majority leave us at the first severe frosts of October, to reappear in February or the first days of March. In general habits this species much resembles the Wood-Pigeon, but differs from that bird in the selection of its nesting-sites, which, in this neighbourhood, are usually the cavities of ash and beech trees, holes in old walls, and beams of our church-belfries ; in open countries the Stock-Dove often makes use of deserted rabbit-burrows, and, strangely enough, in this district, with its abundance of hollow trees and ruins, we have several times found the eggs of this bird in holes scratched by rabbits at the main roots of our ash and elm trees. Two or three pairs of Stock-Doves might always be found nesting in the ivy-clad crannies of Barnwell Castle in our bird-nesting days, and a pair used to nest in the belfry of our parish church at Achurch, from our earliest recollection till the restoration of the church-steeple some twenty years ago. This bird appears to us to be more addicted to green food than the Wood-Pigeon, but it is also very fond of beech-mast ; it is easily decoyed if the shooter is well concealed, but is by far the quickest-sighted bird of our acquaintance, and,

from its marvellous power of vision and rapid twists in the air, by no means so easily brought to bag as its heavier congener. In the pairing-season, early in March, the hoarse guttural note of this bird may be heard in every direction about the house at Lilford, and the males are often to be observed mounting in the air with loud flapping of the wings and gliding for a few moments before pitching into their favourite elm trees, as is also the common habit of the Wood-Pigeon at the same season. In the hollows of our old trees the Stock-Dove seldom makes much, if any, nest, but lays its eggs on the bare wood; in walls and rabbit-burrows we have generally found a slight nest of fine fibrous roots. The eggs, two in number, are rather smaller than those of the Wood-Pigeon, which they otherwise exactly resemble.

This bird usually rears two or three broods, and we often find fresh eggs in September and October. On the south coast of Devon the Stock-Dove haunts the ivy-and-bramble-clad faces of the sea-cliffs and nests amongst this vegetation; we could not, however, discover that it haunts the caves and crevices which on many coasts are the favourite resort of the true Rock-Dove (*Columba livia*), for which bird the present species is often mistaken, but may be readily distinguished by its larger size and the absence of the white patch above the tail, which is always conspicuous in the smaller bird. We have no record of the occurrence of the Rock-Dove in Northamptonshire in a wild state, though many dove-cotes in our neighbourhood are tenanted by a very nearly pure race: it appears, indeed, that in our islands the Rock-Dove haunts exclusively our rocky sea-coasts, and is seldom found at any great distance therefrom; but in Spain, and many other mountainous countries, vast numbers of this species breed in inland cliffs and caves. The flesh of the Stock-Dove is excellent—superior, to our taste, to that of the Wood-Pigeon; and we can confirm in every particular the account given by Yarrell of the custom of the warreners of West Norfolk and Suffolk of hunting for the young doves with dogs trained for the purpose, and making “a very good thing” by extracting and selling them. In most parts of the south of Europe with which we are acquainted the present species occurs as an autumnal migrant; but in Rhenish Prussia we found it sparingly during the summer in the neighbourhood of Neuenahr.

112. TURTLE-DOVE. *Columba turtur*.

This species, which was entirely unknown in the neighbourhood of Lilford in our school-days, has gradually become a regular and sometimes abundant summer visitor to our district, and our country people are all now well acquainted with the “Little Brown Dove,” as they usually call the subject of this article. The Turtle-Dove arrives with us generally very late

in April or in the first week of May, and resorts at once to the old hawthorn bushes and the willows by our rivers and brooks, which are its favourite nesting-localities, though it will build in all sorts of situations which afford quiet and concealment. The nest is an artless platform of a few twigs; the eggs, in common with those of all the species of this family, are two in number and pure white. The first brood of young are generally able to take care of themselves by the third week of June, and flock together in search of food on our pea and clover-fields. The Turtle-Dove appears to us to be almost omnivorous as regards the vegetable productions of our district; but is certainly more beneficial to the farmer than either of the two last-described species, as we have found the crops of several of this species killed in September entirely filled with the seeds of various weeds, and twice have found the remains of small snails and caterpillars amongst the mass of vegetable matter.

The flight of this Dove is swift and very graceful, and its note, though not musical, is pleasant and suggestive of summer. We had more than usual of this species during the summer of 1883; the last seen by us was on September 28th, but, as a rule, they leave us before the middle of that month. The Turtle-Dove is more or less abundant in all parts of Europe with which we have any acquaintance, and is one of the birds which most commonly alight wearied, at the season of migration, on the rigging of vessels in the Mediterranean. In our own country this bird is gradually extending its breeding-range northwards; but, according to the 4th edition of Yarrell's 'British Birds,' the nest has not yet been discovered in Northumberland or over the border. In Andalucia the arrival of the Turtle-Dove is looked for in the spring almost as eagerly as that of the Quail, and parties of shooters sally forth on Sundays and saints' days, equipped in green, and, posting themselves amongst the bushes which fringe the rivers and brooks in that thirsty country, keep up a constant fire upon the passing Doves, which are by no means particularly easy to shoot; a vast number of cartridges and a considerable quantity of tobacco are expended, and a long and "happy day in the country" spent to some profit; for there are few better birds for the table than the Turtle-Dove. Is this a greater waste of time than shooting Pigeons from traps surrounded by a crowd of betting ruffians nearer home?

113. PALLAS'S SAND-GROUSE. *Syrhaptes paradoxus*.

In Prof. A. Newton's exhaustive article upon the irruption of this Asiatic species into Europe, published in 'The Ibis,' 1st series, vol. vi., will be found a note to the following effect:—"Peterborough, 15' W. One or two killed in May or June. No other information. Mr. T. H. Allis, 'Zoologist, page 8724." In reply to my enquiries concerning these

occurrences, I received a few days ago from Mr. J. Bodger, Secretary to the Peterborough Natural History Society, the following extract from the 'Peterborough Advertiser,' of June 20, 1863 :—

"*Rara avis*.—By some singular freak, flights of Sand-Grouse from the steppes of Tartary have recently visited this country, and even manifested a disposition to remain here. One was shot in Thorney Fen, where two or three more are believed to be still at large, and it is to be hoped will be left undisturbed. Mr. Holywell, of Wentworth Street, has two, which he has been stuffing."

The above is the only information which I have hitherto been able to obtain concerning the occurrence of this singular species within our limits. Having no personal acquaintance with this bird in a wild state, we must refer our readers to the article above-mentioned, and also to that by Mr. Henry Stevenson, in his 'Birds of Norfolk,' vol. i. pp. 376—404, in which excellent papers will be found full accounts of the occurrences of this wanderer in our own islands and on the continent of Europe, as well as details of its habits in its native haunts in the vast plains of Asia. We have a fine pair of this species, stuffed, in our collection, which were obtained near Great Yarmouth in the summer of 1863.

We are well acquainted with the two European species of Sand-Grouse, viz. *Pterocles arenarius* and *P. alchata*, both of which are common in many parts of Spain, but have not, as yet, been included in the ranks of British birds. The habits of Pallas's Sand-Grouse appear to resemble closely those of the other species of the family, all of which are lovers of treeless wastes, remote from the habitation of man.

114. BLACK GROUSE. *Tetrao tetrix*.

The only occurrence of this species in Northamptonshire which has hitherto come to our knowledge will be found recorded by me in the 'Zoologist' for 1851, vol. ix. p. 3278, in the following words :—"A grey hen was observed, in September, 1849, in a wheat-stubble near Cranford, the seat of Sir G. Robinson, and was afterwards seen three or four times in that neighbourhood and in Grafton Park; and in May or June, 1850, a labourer at Cranford, in clearing out a ditch, disturbed her from a nest containing ten eggs, which were put under a hen, but all proved rotten. I never heard of this bird in this county before, and the nearest place that I am aware of in which they are indigenous is Sherwood Forest, in Nottinghamshire." I may add that my informant was my cousin, the late Rev. George Stopford, who was then Rector of Warkton, near Kettering, and who himself saw the above-mentioned bird on more than one occasion.

The present is a very erratic species, and often wanders far from its regular haunts, of which the nearest to the above-mentioned locality is, I believe, really Charnwood Forest, in Leicestershire.

Abundant in many parts of Scotland, and more or less common in the border counties of England, I find the Black Grouse recorded as a resident species in Nottingham, Salop, Stafford, Norfolk, Wilts, Berks, Hants, Sussex, Surrey, Dorset, Somerset, Devon, and Cornwall, as also in a few counties of Wales, but in none of these localities can it be called very common; it is not indigenous in Ireland, and all of the many attempts made to establish it in various parts of that country have, so far as I know, resulted in failure. The localities especially affected by this species are rough moors bordered by woods, with an abundant supply of water and of rushes. In August and early September I have often come upon broods of Black Game far away from any trees or even bushes of any kind, but never very far from water or the favourite rushes. At this season there is no difficulty in destroying the whole brood, as they run close before the dogs and eventually squat till actually kicked up one by one; it is not, however, by any means so with the old cock-birds, who are at all times exceedingly wary and cunning, and, being in moult during the early part of the shooting-season, are seldom to be met with away from good covert, amongst which they run and hide when pursued, and, on being flushed, generally are wise enough to fly back over the heads of the beaters instead of coming forward over those of the "guns;" as the season advances, old and young crowd to glean upon the cleared stubble-fields adjoining the moors, and excellent sport is then to be had, both by stalking and driving.

The food of the Black Grouse varies with the seasons, but, whilst they are to be found, we think that the seeds of the rush form the favourite staple; besides these the common moor-growing berries, corn of all sorts, and the young shoots of birch, alder, and various species of fir all come in for a share of attention according to circumstances, and ants and their eggs are very favourite morsels, as is the case with most of our game birds. As our acquaintance with the habits and customs of the Black Grouse during the summer months is very limited, we must refer our readers to the many writers who have described the exceedingly curious scenes to be witnessed on the so-called "pairing-grounds" in early spring, and content ourselves by stating that this species is polygamous, that the nest is usually placed under or near some thick low-growing bush, such as the bog-myrtle; the eggs average about eight or nine, very seldom more than ten, in number, and are of a creamy white, freckled with light reddish brown. We have found young Black Game, hatched out under a common barnyard fowl, easy to rear on a mixture of dry and green food, and an occasional course of ants' eggs; they devour earthworms and certain caterpillars very readily, and

become exceedingly tame. Many instances are on record of the interbreeding of this species with the Pheasant and with other species more nearly allied to it, and varieties of the pure-bred birds often occur. We had the pleasure some few days ago of examining the skin of a fine adult male procured in Leadenhall market, in which a great portion of the plumage of the back and wings was barred and marked so as to resemble in no small degree that of a Silver Hamburg Fowl. The Black Grouse is found in suitable localities in many, if not most, parts of Europe and temperate Asia; its occurrence in Spain, however, seems to be open to doubt, though it is found in certain localities on the French side of the Pyrenees. It is perhaps superfluous to add that as we have neither pine-forests, granite mountains, nor heather-clad moors in our county, our other three British species of Grouse, viz. Capercaillie, Red Grouse, and Ptarmigan, are therein unknown; but there is another European species of this family, to wit, the Hazel-Grouse (*Bonasia betulina*), which is tolerably common in certain parts of Central Europe, and could, as we are convinced, be successfully introduced into our islands. The experiment is well worthy of a trial, as the bird in question is a beautiful species, excellent for the table, and would not require much, if any, artificial protection; it belongs, as does the Black Grouse, to what we may call the arboreal division of the Grouse family, in which the toes are not feathered as they are in our Red Grouse and Ptarmigan.

To return to the subject of the present article, the only district in which we have personally met with it, outside the British Isles, is in the Alps of North-western Italy, where it is sparingly found in the pine-forests, and known to the natives as "Fagiano," which word properly applies to the Pheasant. The few Black Game which, with great toil, we had the good fortune to bring to bag in these last-mentioned localities in August, 1858, had their crops crammed with cranberries and seeds of the rush.

115. PHEASANT. *Phasianus colchicus*.

It is not my intention to enter into a detailed account of the habits of this well-known bird, which, in most parts of our country, and especially in those where foxes are preserved, can only exist under artificial conditions and human protection. Our country, with its great woods interspersed with arable lands, is well adapted to the requirements of the Pheasant, and, with intelligent gamekeepers and favourable seasons, we can hold our own in comparison with the bags of Pheasants made in similar districts—but not, of course, with those of Norfolk and Suffolk, the whole of which counties are more or less efficiently "preserved" for Pheasants, their soil most favourable for feathered game, and the natural enemies of game easily kept

down. Although it is now difficult to find pure-bred specimens of the species whose name stands at the head of this article, on account of the frequent crossings with the Chinese Ring-necked Pheasant (*Phasianus torquatus*) and other species, in the large woodlands of the northern division of Northamptonshire, which, by their small size, the absence of any trace of the white collar, which is so conspicuous in the Chinese bird, and the intense blackness of the plumage of the lower belly and vent, present the characteristics of the true unadulterated species.

At Lilford we have very successfully introduced the Ring-necked species, and still more so the Green Pheasant of Japan (*Phasianus versicolor*), both of which interbreed freely with our original stock and with each other; the hybrids are most beautiful birds, greatly exceeding their parents in size and weight, and certainly prolific, *inter se*, for some generations.

Gamekeepers do not much approve of the pure-bred Chinese birds, as they are much given to roaming far away from their homes, and from their shy habits are not so easily brought to the gun as the others. With regard to another most beautiful species, known as Reeves's or the Bar-tailed Pheasant (*Phasianus reevesi*), though we have found it hardy, easy to rear, and excellent for the table, our opinion is, that as it possesses the roaming instinct in a still higher degree than the pure Ring-necked species, and is of a very wild and wary nature, it is not a desirable bird, from a sporting-point of view, except in very large ranges of woodland; and from what we have heard from a friend who has been in the native haunts of this fine bird in the mountains of Northern China, we are inclined to think that it is more likely to prosper in Scotland and in Wales than in our midlands. The hybrids between this and the Common Pheasant are beautiful birds, but not, so far as we have been able to ascertain, prolific.

The Pheasant, where not preserved in unreasonable numbers, is a good friend to the farmer, from the enormous number of wire-worms and other noxious insects which it devours, to say nothing of its liking for the roots of various weeds; but it would be absurd to deny that grain forms its favourite food, and a field of standing beans will, as is well known, draw Pheasants for miles. It is very much the fashion to feed the birds with maize; but, in our opinion, the flesh of Pheasants which have been principally fed upon this corn is very far inferior in flavour to that of those who have found their own living upon what the land may offer them.

The great question of "battue" shooting is not one upon which we have the slightest desire to enter the lists; as sport, in the legitimate sense of the word, we hold this fashion of shooting somewhat low in estimation, though Pheasants flushed at a fair distance, and put over the guns at a good height, are by no means so easy to kill as many persons seem to imagine.

and it must be remembered that many game-preservers have no other means of giving their friends a day's out-of-door amusement. Nor can it be denied that the rearing and preservation of Pheasants gives employment to many, and supplies our markets with excellent and wholesome food, besides enabling the owners of preserves to make very welcome presents to friends and neighbours. But the whole question has been so often and so ably argued by more competent pens than ours, that we are quite content to leave it as it stands. There appears to be no reason to doubt that the Pheasant was introduced into England by the Romans, and the bird has now become so spread over most parts of Europe that it is almost impossible to say where it is most indigenous. The only country in which we have personally met with it in an unpreserved and perfectly wild state is on the shores of the Adriatic, near Alessio in Albania, where it is, or was, by no means uncommon in the low-lying forest country near the mouth of the river Drin; it is also to be found in considerable numbers near Salonica and in certain other localities of European Turkey. But the best authorities seem to agree that the true home and headquarters of the species are the shores of the Caspian, the valley of the Caucasus and northern Asia Minor; very closely allied forms, however, are to be met with from the Caspian, through Asia to the shores and islands of China. White and pied varieties of the Pheasant are very much too common in our county, as elsewhere the most remarkable and least objectionable, to our minds, being that which, for some mysterious reason, is known as the Bohemian Pheasant, and in many respects presents indications of a normal race or species.

(To be continued).

PHENOMENON OBSERVED AT SEDGEBROOKE.

THE 23rd of November last was a fine bright day, but rather cold; there was no wind, only a slight movement of the air from the north.

At ten o'clock in the evening, or according to the new reckoning at 22 o'clock, there was a dead calm, the sky being partially overcast and misty, the thermometer being at that time only two degrees below freezing.

I was at that hour walking up the Pitsford Lane, and I was much surprised to hear the leaves from the elm trees falling thickly on the ground; there being no wind I was at a loss to know why the leaves were falling in such quantities.

However I suppose it was the effect of the frost on the stem of each leaf, swelling the moisture at the joint of the stem with the branch, and thus as it were pinching the leaves off.

C. A. MARKHAM.

March 31st, 1885.

THE BOOK OF NATURE.

A SUMMER POOL.

It was a summer day—one of those most beautiful summer days that seem to wrap us about and fill us with the inspiration of nature. “The living presence of the earth” was everywhere,—filling the air, passing thro’ the woods, and casting its gentle influence over every living thing. It was on such a day that I discovered one of those most lovely gems that adorn our earth. It was one of those combinations of light, and colour, and form, and life, and peace.

It was said by the people that “long ago hereabouts” had been a great mansion, and that it had been destroyed by war. There were large mounds to be seen—grassy mounds, beneath which were the foundations and the ruins. There were wide reaches of pasture land, belts and patches of wood, that in places overhung and enclosed the little stream that flowed in such winding course thro’ the valley. There were the remains of an avenue of elms—the growth of centuries—many of which the storms had rent and torn; but there still stood in line some two score of the trusty sentinels, as tho’ still guarding the ruins that man had wrought upon the mansion that they had been planted to shelter and adorn.

There was still standing close by a broad and long belt of chestnut, and firs, and cedars, and many a sturdy oak and beech, under whose shade were laurels, and the box tree, and the yew, all growing among a tangle of wild roses and honeysuckles and a countless multitude of flowers. There was every evidence that the hand of some lover of the beautiful forms wherewith God had adorned the earth had been busy in thus clothing and embellishing the banks of the stream. There were also evidences that some gentler hand had planted a garden in the midst of this woodland—a remnant of which still lived in this peerless gem—that the hand of man had not ravished, and that time had left untouched, unsullied.

It was a little pool. The banks on either side had been scooped out and the bed deepened so that the stream could not be seen as it passed through. It flowed in with a soft ripple and was at once lost in the deep blue water, and it passed onward and away without a murmur.

On one side was a little terrace overhung by the heavy branches of the chestnut, and on the other side a sloping bank, partly shadowed by the beech. The foliage, the branches, and the blossoms intertwined, while the

bright clear beams of light shot thro' the mazes like bars of polished silver. There was the tangle of a thousand flowers growing on the margin of the pool. Every colour—crimson, and white, and purple, and blue, all toned by the soft grasses, and the light falling in ten thousand sparkles like rain drops over all.

This was only the setting of the picture. It was the clear and beautiful water, the small jungle of rushes at one corner, the pale green masses of leaves that floated so gracefully in another part, and the other large round leaves that lay in the broad, clear sunlight, while at the further edge was a crowd of large bright yellow flowers, fringed by a mass of small white and scarlet blossoms. But how exquisitely lovely—as tho' the queen of the flower world was here enthroned—were the group of stately water lilies. As tho' the pearly light had been refined and moulded into shape and life, and set upon the water, floated the white and gorgeous blossoms. All the other and beautiful parts of nature seemed made but to add lustre and glory to these. They lifted up their faces to the light as tho' they alone were the children of the great white sun that fills the world.

There was no sound during the heat of the day but the soft breath of the wind. The insects were at rest upon the rushes, and the active little water beetles that are ever so busy lay hidden among the multitude of shining leaves. The only watchful creature was the little willow-wren, that darted ever and again from beside its nest as some giddy fly came from its resting place to flash its wings in the warm sun ; or the swallow as it sped by like a thread of light.

Here was light, and shade, and colour, and life, and rest. As tho' an angel's white wing of peace had overshadowed the whole place, it brought to remembrance the promise of "The New Heaven and the New Earth" that shall be when the reign of evil shall have ceased in the world. As I rested on the margin it seemed that the second paradise was near at hand. I had almost forgotten the world and the countless and boundless buffetings of men, in the calm—the hush of all around. Then the crowds of living creatures started again into life ; and there was the deep and ceaseless hum of the insects and the cry of the birds as they answered each other.

There was the beautiful pool—a legacy from the ages. Whoever had looked upon a more lovely picture ? That little bunch of blue flowers nestling by the side of the peerless queen of the waters ; those delicate willow branches toying with and kissing the water, stirring it ever and anon into gentle eddies that were as so many dimples upon the fair face ; that dark shadow at the right hand where the heaving foliage of the great beech tree overhung the banks, while opposite is the flood of light falling and sparkling like a rain of diamonds. There are ten thousand wonderful sights

—the flashing of the bright plumage of a passing bird ; the rapid, nervous, darting in and out from the rushes of the bright little water-chasers ; then the half sleepy fluttering of some drowsy-winged moth that has been disturbed from its slumbers ; then the sailing across the lake of a score of pink and rosy cups that have fallen from the great bunches of chestnut blossoms—a minature fleet on a minature sea ; and again there is the soft cooing of the doves—the short sweet snatches of song from a hundred songsters. Then the murmur of the distant weir and the rustle of the wind among the fir trees that is so like the breaking of the tide upon the sandy beach.

Who would not sit down and revel in such a picture-page. We see children absorbed in the marvels of some wonderful story forgetting all else in the world. Such a wonderful page was this ; a world of itself—a bower of beauty. I had rested for an hour looking into the clear water and upon the mazes of flowers and foliage and listening to the soft voices that filled the air, and could not but think how much of pleasure is lost even to the wise among the sons of men from the neglect of this great book of God.

When starting on my day's ramble I had met a friend who "could not understand" however any one could go out and alone for pleasure. "It was so solitary, so gloomy" he said. He had not learned to read the book. He had been absorbed in philosophy and the study of man until he had almost forgotten the presence and the hand of God in the world. He had learned to believe that man's intellect was almost divine, but that it and his body had passed thro' many stages from the lowest form of life, and was still further to be developed "somehow ;" but he was most puzzled by that link in the chain—the "days" after death. I could not but think that if he would rest from his researches for a time and read some of the histories, and stories, and poems that are to be found in the "unwritten revelation," he would go back to his books and studies with a clearer brain, a fresher life, and a gladder heart.

W. BARTON.

METEOROLOGICAL REPORT AND OBSERVATIONS, 1885.

JANUARY.

JANUARY was on the whole a fairly fine, but dull month, the sun shining on four days only ; fog appeared on three days, and snow on four days. The mean temperature for the month was 35° , or 6° below the average. The rainfall, 1.26 inch, was very light, being 0.62 inch below the average of the last 16 years. The barometer varied considerably—from 30.10 inches on the 1st to 28.70 inches on the 11th and 31st.

FEBRUARY.

The temporary interruption to the mild weather of the present winter, which was experienced in January, has been more than outweighed by the exceptionally warm weather which has continued almost without interruption throughout this month. The mean temperature for the month, 42° , was 3° above the average. The maximum temperature varied from 38° on the 20th to 57° on the 24th. The minimum temperature varied from 23° on the 21st to 45° on the 13th, 25th, and 27th. The rainfall, 2.86 inches, was excessive, being 1.01 above the average of the last 16 years. The variations of the barometer were from 28.80 inches on the 1st to 29.93 inches on the 21st.

MARCH.

This month was generally cold and dry, but the sensation of cold was greater than actually shown by the thermometer, owing to the persistency of dry northerly and north-easterly winds. The drying nature of these winds, however, proved of great value to the land after the heavy rains of February, and the weather has been in everyway favourable for agricultural work. The temperature was rather below the mean, the mean maximum being 48° and the mean minimum being 32° , the variations being from 57° on the 31st, to 27° on the nights of the 2nd, 8th, and 15th. The rainfall, 0.96 inch, was very low, being 0.39 inch, or more than one-third below the average of the last 16 years. Snow fell on the 6th and 21st. The barometer was fairly steady, varying from 29.10 inches on the 3rd and 6th to 30.40 inches on the 14th. The wind was north-easterly for the first fourteen days, then south-west and north-west, with a slight touch of east to the end of the month.

F. LAW.

JANUARY, 1885.

STATION.	OBSERVER.	RAINFALL.				SHADE TEMPERATURE.			
		Total for Month.	Total for Year.	Greatest Fall.	Wet Days.	Maximum.		Minimum.	
				In. Data.		Deg.	Date.	Deg.	Date.
Northampton ..	H. Terry	1.42	1.42	0.20	10	48	28	23	21
" ..	F. Law	1.28	1.28	0.17	9 & 10	52	29	21	23
Castle Ashby ..	R. G. Scriven	1.64	1.64	0.25	10	60	27	18	21
Litchborough ..	Ed. Grant	1.80	1.80	0.25	9	51	29 & 31	20	24
Sedgebrook ..	C. Markham	1.79	1.79	0.34	10	51	29	20	25
Rothwell ..	J. More, M.D.	1.45	1.45	0.26	10	..	..	..	..
Oundle	S. P. Holloway	1.18	1.18	0.22	10	..	..	..	..
Towcester ..	P. Phipps, M.P.	1.56	1.56	0.21	30	..	..	..	..
Little Houghton	J. Brawn	1.54	1.54	0.27	10	47	29	22	25
Fawsley	Lady Knightley	1.59	1.59	0.24	14	48	28 & 29	21	21
Thorpe Man'ville	Seth Baines	2.06	2.06	0.30	9	49	28	23	25
Twywell Rectory	Rev. H. Waller	1.32	1.32	..	..	..	..	..	..
Floore	E. G. Loder	1.81	1.81	0.27	15	50	29	20	23
Whittlebury ..	W. S. Miller	1.85	1.85	0.29	9	50	28	18	21
Hazelbeach ..	Mrs. Albert Pell ..	1.63	1.63	0.45	9	50	29 & 30	25	1
Rockingham. Cstl.	H. Wate	1.48	1.48	0.20	9	54	30	19	2
Holdenby	Rev. F. C. Alderson	1.68	1.68	0.27	10	..	..	..	..
Kettering	C. W. Lane	1.86	1.86	0.41	10	48	28	24	21
Peterborough ..	J. Whitwell	1.08	1.08	0.20	26	53	28	20	21
Maxey Vicarage.	Rev. W. D. Sweeting	1.09	1.09	0.21	10	..	..	..	..
Av. 19 yrs 1866-84	H. Terry	2.05	2.05	..	..	..	..	..	..

FEBRUARY.

Northampton ..	H. Terry	2.92	4.34	0.55	4	50	12	19	21
" ..	F. Law	2.86	4.12	0.55	4	57	24	23	21
Castle Ashby ..	R. G. Scriven	2.52	4.16	0.51	16	59	24	20	20
Litchborough ..	Ed. Grant	3.60	5.40	0.73	4	54	12	20	20
Sedgebrook ..	C. Markham	2.62	4.41	0.58	16	58	24	19	21
Rothwell ..	J. More, M.D.	2.35	3.80	0.62	4	..	..	..	..
Oundle	S. P. Holloway	2.08	3.26	0.60	16	..	..	..	..
Towcester ..	P. Phipps, M.P.	2.98	4.54	0.62	4	..	..	..	..
Little Houghton	J. Brawn	2.65	4.10	0.55	16	46	12	20	21
Fawsley	Lady Knightley ..	2.45	4.04	0.60	16	51	12 & 27	21	20
Thorpe Man'ville	Seth Baines	3.20	5.26	0.64	4	55	28	23	21
Twywell Rectory	Rev. H. Waller	2.05	3.37	..	..	..	..	..	..
Floore	E. G. Loder	2.95	4.61	0.66	4	51	28	19	20
Whittlebury ..	W. S. Miller	3.33	5.18	0.57	16	57	24	17	20
Hazelbeach ..	Mrs. Albert Pell ..	2.66	4.29	0.60	16	54	13 & 14	25	20
Rockingham. Cstl.	H. Wate	2.50	3.98	0.59	16	55	12 & 27	19	20
Holdenby	Rev. F. C. Alderson	2.25	3.93	0.55	16	..	..	..	..
Kettering	C. W. Lane	2.10	3.96	0.51	16	54	24	24	21
Peterborough ..	J. Whitwell	1.89	2.97	0.65	16	57	12	26	20
Maxey Vicarage.	Rev. W. D. Sweeting	1.87	2.96	0.69	16	..	..	..	..
Av. 19 yrs 1866-84	H. Terry	1.90	3.29	..	..	..	..	..	..

MARCH.

Northampton ..	H. Terry	0.99	5.38	0.34	3	9	48	17	20	1
" ..	F. Law	0.96	5.08	0.37	3	10	57	31	27	2 & 8
Castle Ashby ..	R. G. Scriven	1.25	5.41	0.46	3	11	57	20	26	22
Litchborough ..	Ed. Grant	1.04	6.44	0.33	3	12	60	20	25	1 & 8
Sedgebrook ..	C. Markham	0.90	5.31	0.32	3	10	55	20	23	15
Rothwell ..	J. More, M.D.	0.72	4.52	0.23	3	9	..	..	..	..
Oundle	S. P. Holloway	0.97	4.23	0.43	3	10	..	..	..	..
Towcester ..	P. Phipps, M.P.	0.99	5.63	0.42	3	7	..	..	..	..
Little Houghton	J. Brawn	1.02	5.21	0.35	3	7	47	20	30	1
Fawsley	Lady Knightley ..	0.88	4.92	0.29	21	13	54	20	28	9 & 14
Thorpe Man'ville	Seth Baines	1.07	6.33	0.38	21	8	58	19	26	20
Floore	E. G. Loder	1.01	5.62	0.44	21	6	51	31	24	7
Twywell Rectory	Rev. H. Waller	0.58	3.95	..	..	..	..	..	..	..
Whittlebury ..	W. S. Miller	1.26	6.44	0.46	3	9	56	20	22	6
Hazelbeach ..	Mrs. Albert Pell ..	0.98	5.27	0.30	3	9	51	17	28	18
Rockingham. Cstl.	H. Wate	0.92	4.90	0.32	3	5	56	30	23	1
Holdenby	Rev. F. C. Alderson	1.13	6.06	0.26	3	13	..	..	..	..
Kettering	C. W. Lane	0.80	4.76	0.28	3	10	54	20	27	2 & 15
Peterborough ..	J. Whitwell	1.11	4.08	0.44	3	8	61	21	26	1
Maxey Vicarage.	Rev. W. D. Sweeting	0.93	3.89	0.46	3	7	..	..	..	..
Av. 19 yrs 1866-84	H. Terry	1.50	5.29	..	..	..	..	..	..	..

HENRY TERRY, SURGEON.

A CATALOGUE OF THE GEOLOGICAL COLLECTION IN THE NORTHAMPTON MUSEUM.

PART III.

THE CARBONIFEROUS SYSTEM.

THE Carboniferous System is so named from the fact that it is the great coal-producing formation in this country. The coal however is almost entirely confined to the upper portion, called the *Coal-measures*.

It is impossible to draw any sharp line of demarcation between the Old Red Sandstone and the Lower Carboniferous rocks, lithologically, nevertheless the fossils are quite distinct and point to different conditions of deposit. The Carboniferous rocks show evidence of the comparative nearness of land, plants remains being found in all the beds; on this account the period has been called the *Phytozoic Period*, or *Age of Plants*.

The following are the chief divisions of the Carboniferous Rocks :—

Upper Carboniferous.	{	Coal Measures...	{	Upper Middle Lower
		Millstone Grit (Farewell Rock).		
		Upper Limestone Shale (Yordale Rocks).		
Lower Carboniferous.	{	Carboniferous Limestone (Mountain Limestone).		
		Lower Limestone Shale.		
		Tuedian Group.		

The Carboniferous Limestone, from which most of the fossils in our Museum came, is generally a tough, bluish grey, crystalline limestone, which emits a sulphurous odour when fractured. In some places, Derbyshire and the counties north of it, for instance, the rock forms mountains, and hence is often called the *Mountain Limestone*. It seems also to have formed considerable hills in the Midland and Southern counties at one time, for it has several times been met with in deep borings for water or coal. Within the last few years it has been met with three times in Northamptonshire, at the Spinney Well, Kettering Road; Gayton; and Orton. Several of the cores from these localities are now in the Museum, having been presented by Mr. J. Eunson, F.G.S., who conducted two of the borings mentioned. An account of these several borings and list of fossils has been published by Mr. H. J. Eunson, F.G.S.*

* "On the Range of the Palaeozoic Rocks beneath Northampton," by Mr. H. J. Eunson, F.G.S. Quarterly Journal of the Geological Society, Aug., 1884.

The Carboniferous Limestone is often called the "Scar Limestone" in the North of England; it varies very much in thickness in different parts, but the greatest thickness recorded is 3,000 feet in the Mendip Hills.

The Millstone Grit consists of coarse sandstone, grits, shales, and conglomerates. It underlies the coal-measures, but does not itself contain any workable coal seams. Its name is derived from the use to which some of its finer sandstones are put. A common name for it in the South Wales district is the "Farewell Rock," because no workable coal is met with in or below it. The total thickness is over 3,000 feet.

Pieces of the Millstone Grit are occasionally met with in the drift gravel of this county.

The Coal Measures consist of shales, grits, sandstones, etc., and are characterized by the abundance of coal seams they contain. The beds of coal are generally found in depression in the strata called "*Basins*," not that they were deposited there, but that only in such situations have they been preserved. In South Wales the total thickness of the beds is estimated at 10,000 to 12,000 feet. It was noticed many years ago that in the South Wales coalfield every coal seam rested upon a bed of clay, called on that account the "*underclay*," and that this clay contained the roots of some of the plants found above, that it was indeed the soil on which the plants grew, and this is generally the case with other coalfields.

It appears likely that the Coal-measures were deposited in a slowly subsiding area, the pauses in subsidence being represented by the different seams of coal. The deposit was in most cases freshwater or fluviomarine, judging by the nature of the fossils.

It is quite unnecessary here to give the names of the divisions of the coal-measures at any places, because they are generally of a local character only, but we may say that the Upper and Lower Coal-measures are characterized by thin seams, and the Middle by thick seams.

Naturally the fossils from the Coal-measures are mostly plants, but the structure of the plants can seldom be seen in the coal itself except by making thin sections and examining under the microscope. Most macroscopic specimens are from the underclays; here they have been better preserved and are better seen.

The specimens from the Carboniferous system in our Museum are chiefly from the Carboniferous or Mountain Limestone; one of the most interesting is a large slab of Limestone from Swaledale in Yorkshire, showing in relief some fine specimens of *Woodocrinus Macroductylus*, which was presented to the Museum by — Cecil, Esq. Other noticeable fossils are some polished sections of corals from the Avon Gorge near Clifton, and some specimens of Macrourous Crustaceans from Eskdale; in this formation (Carboniferous) we see the last of the trilobites, of which there is a very

perfect specimen (*Griffithides globiceps*). Some of the best hunting grounds for fossils of the Carboniferous Limestone are Clifton near Bristol, Castleton, Crich Hill, Matlock, Ashford, all in Derbyshire, and numerous places in Lancashire and Yorkshire; in Ireland, too, the Carboniferous Limestone occupies a large extent of the surface.

THE FOLLOWING IS A LIST OF CARBONIFEROUS FOSSILS NOW IN THE
CASES AT THE MUSEUM.

Coal Measures	...	...	...	...	C. M.
Millstone Grit	...	...	...	...	Mill. Gr.
Mountain or Carboniferous Limestone	...	...	...	...	Car. L.
Carboniferous Shale	...	...	...	...	Car. Sh.

PLANTÆ.

	Formation.	Locality.
<i>Carpolithes marginatus</i> ...	... C. M. ...	
<i>Calamites</i> ...	... C. M. ...	Lancashire.
<i>Calamites radiatus</i> ..	... C. M. ...	Ashby-de-la-Zouche.
<i>Lepidodendron</i> ...	... C. M. ...	Coalbrook Dale.
<i>Flemingitis gracilis</i> ...	... C. M. ...	Grange.
<i>Neuropteris gigantea</i> , <i>Stern.</i>	... C. M. ...	South Wales.
<i>Neuropteris</i> ...	... C. M. ...	Coalbrook Dale.
<i>Knorria</i> ...	... C. M. ...	
<i>Sigillaria tessellata</i> , <i>Br.</i> ...	... C. M. ...	Ashby-de-la-Zouche.
<i>Stigmaria ficoides</i> , <i>Br.</i> ...	... C. M. ...	Wigan.
<i>Sphenopteris affinis</i> ...	... C. M. ...	Burdie House.
<i>Sphenopteris furcatus</i> ...	... C. M. ...	
<i>Sphenophyllum erosum</i> , <i>L. & H.</i> ...	...
<i>Trigonocarpum olivæformis</i> , <i>Lindley</i> <i>and Hutton</i> ...	...	Lancashire.

ACTINOZOA.

<i>Amplexus coralloides</i> , <i>Sow.</i> ...	... Car. L. ...	Ireland.
<i>Cyathophyllum regium</i> , <i>Phil.</i> ...	... Car. L. ...	Clifton.
<i>Cyathophyllum Stutchburyi</i> , <i>Edw.</i> <i>and Haime</i> ...	... Car. L. ...	Clifton.
<i>Cyathophyllum Murchisoni</i> , <i>Edw.</i> <i>and Haime</i> ...	... Car. L. ...	
<i>Michelinia megastoma</i> , <i>Edw. & Haime</i>	... Car. L. ...	Ireland.
<i>Lithodendron junceum</i> , <i>Fl.</i> ...	... Car. L. ...	Kettering Road Boring, Northampton.
<i>Lithodendron affine</i> , <i>Fl.</i> ...	... Car. L. ...	Clifton.
<i>Lithostrotion basaltiformis</i> , <i>Edw. and</i> <i>Haime</i> ...	... Car. L. ...	Ireland.

	Formation.	Locality.
<i>Lithostrotion Martini</i> , <i>Edw. & Haime</i>	Car. L. ...	Crich Hill, Derbyshire.
<i>Lithostrotion irregulare</i> , <i>Edw. & Haime</i>	Car. L. ...	Clifton.
<i>Lonsdalei floriformis</i> , <i>Edw. & Haime</i>	Car. L. ..	Clifton.
<i>Zaphrentis cylindrica</i> , <i>Edw. & Haime</i>	Car. L. ...	Preston.
<i>Zaphrentis Phillipsia</i> , <i>Edw. & Haime</i>	Car. L. ...	Yorkshire.

BRZOOA.

<i>Fenestella antiqua</i>	Ireland.
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CRINOIDEA.

<i>Actinocrinus amphora</i> , <i>Goldf.</i>	...	Car. L. ...	Yorkshire.
<i>Actinocrinus triacantadactylus</i> , <i>Mill.</i>	...	Car. L. ...	Wexford.
<i>Actinocrinus polydactylus</i> , <i>Mill.</i>	...	Car. L. ...	Clitheroe.
<i>Actinocrinus Gilbertsoni</i>...	...	Car. L. ...	Clitheroe.
<i>Archæocidaris urii</i>	...	Car. L. ...	Wexford.
<i>Blastoidea</i>	...	Car. L. ...	
<i>Codonaster acutus</i>	...	Car. L. ...	
<i>Gilbertocrinus</i>	...	Car. L. ...	Lancashire.
<i>Pentremites Derbiensis</i> , <i>Sow.</i>	...	Car. L. ...	
<i>Pentremites inflatus</i> , <i>Gilbert</i>	...	Car. L. ...	Ireland.
<i>Platycrinus lævis</i> , <i>Mill.</i>	...	Car. L. ...	Yorkshire.
<i>Platycrinus elongatus</i> , <i>Gilb.</i>	...	Car. L. ...	Yorkshire.
<i>Poteriocrinus</i>	...	Car. L. ...	
<i>Woodocrinus macrodactylus</i>	..	Car. L. ..	Swaledale.

CRUSTACEA.

<i>Anthropalæmon Etheridgii</i> , <i>Peach.</i>	Lower Car. Sh.	Eskdale.
<i>Anthropalæmon Traquairii</i> , <i>Peach.</i>	Lower Car. Sh.	Eskdale.
<i>Entomoconchus Scowleri</i> , <i>McCoy</i> ...	Car. L.	
<i>Estheria</i>	Lower Car. Sh.	Eskdale.
<i>Eoscorpius inflatus</i>	Lower Car. Sh.	Eskdale.
<i>Ceriatocaris</i>	Lower Car. Sh.	Eskdale.
<i>Palæocrangon Eskdalensis</i>	Lower Car. Sh.	Eskdale.
<i>Griffithides globiceps</i> , <i>Phil.</i>	Car. L.	Castleton.
<i>Phillipsia Derbiensis</i>	Car. L.	Bakewell.
<i>Phillipsia</i> sp.		Mold, Flintshire.

BRACHIOPODA.

<i>Discina nitida</i> , <i>Phil.</i>	...	C. M. ...	Coalbrookdale.
<i>Athyris globosus</i>	...	Car. L. ...	
<i>Athyris ambigua</i> , <i>Sow.</i>	...	Car. L. ...	Belgium.
<i>Athyris expansa</i> , <i>Phil.</i>	...	Car. ...	
<i>Athyris Roisyyii</i> , <i>L'Eveillé</i>	...	Car. L. ...	Belgium.

	Formation.	Locality.
<i>Crania</i> ... ..	... Car. L. ...	Preston, Lancashire.
<i>Orthis resupinata</i> , <i>Martin</i>	.. Car. L. ..	Ireland.
<i>Orthis Michelini</i> , <i>L'Eveillé</i>	.. Car. L. ...	Belgium.
<i>Productus striatus</i> , <i>Fischer</i>	... Car. L. ...	Derbyshire.
<i>Productus undatus</i> , <i>Dep</i> ...	... Car. L. ...	Derbyshire.
<i>Productus semireticulatus</i> , <i>Martin</i> ...	... Car. L. ..	Derbyshire.
<i>Productus giganteus</i> , <i>Martin</i>	... Car. L. ...	Clifton.
<i>Productus cora</i> , <i>D'Orb.</i> ...	... Car. L. ...	Castleton.
<i>Productus fimbriatus</i> , <i>Sow.</i>	.. Car. L. ...	Derbyshire.
<i>Productus scabriculus</i> , <i>Martin</i>	... Car. L. ..	Derbyshire.
<i>Productus latissimus</i> , <i>Sow.</i>	... Car. L. ...	Preston.
<i>Productus plicatilis</i> , <i>Sow.</i>	.. Car. L. ...	
<i>Productus costatus</i> , <i>Sow.</i>	... Car. L. ...	Derbyshire.
<i>Spirifera glabra</i> , <i>Martin</i> ...	... Car. L. ...	
<i>Spirifera striata</i> , <i>Martin</i> ...	... Car. L. ...	Derbyshire.
<i>Spirifera cuspidata</i> , <i>Martin</i>	... Car. L. ...	Derbyshire.
<i>Spirifera pinguis</i> , <i>Sow.</i> ...	... Car. L. ...	Derbyshire.
<i>Spirifera ovalis</i> , <i>Phil.</i> ...	... Car. L. ...	
<i>Streptorhynchus crenistria</i> , <i>Phil.</i>	... Car. L. ...	
<i>Rhynchonella angulata</i> , <i>Linn.</i>	... Car. L. ...	
<i>Rhynchonella pleurodon</i> , <i>Phil.</i>	... Car. L. ...	Castleton.
<i>Rhynchonella pugnus</i> , <i>Martin</i>	... Car. L. ..	Castleton.
<i>Rhynchonella reniformis</i> , <i>Sow.</i>	... Car. L. ...	
<i>Rhynchonella cordiformis</i> , <i>Sow.</i>	... Car. L. ...	
<i>Rhynchonella acuminata</i> , <i>Martin</i>	... Car. L. ...	Derbyshire.
<i>Terebratula hastata</i> , <i>Sow.</i>	... Car. L. ...	Ireland.
<i>Terebratula sacculus</i> , <i>Martin</i>	... Car. L. ...	Castleton.
<i>Strophomena analoga</i> , <i>Phil.</i>	... Car. L. ...	

CONCHIFERA.

<i>Aviculopecten granosus</i> , <i>Sow.</i>	... Car. L. ...	Ireland.
<i>Cardiomorpha oblonga</i> , <i>Sow.</i>	... Car. L. ...	Ireland.
<i>Gervillia</i> sp. ... ..	... Car. L. ...	Preston.
<i>Inoceramus vetustus</i> , <i>Sow.</i>	... Car. L. ...	Yorkshire.
<i>Pecten</i> sp. .. ..	.. Car. L. ...	Ireland.
<i>Pleurorhynchus Hibernicus</i> , <i>Sow.</i>	... Car. L. ..	Ireland.
<i>Pleurorhynchus aliformis</i> , <i>Sow.</i>	... Car. L. ..	Ireland.

PTEROPODA AND NUCLEOBRANCHIATA.

<i>Conularia quadrisulcata</i> ...	.. C. M. ...	Coalbrookdale.
<i>Bellerophon Urii</i> , <i>Fleming</i>	... Car. L. ...	Belgium.
<i>Bellerophon Costatus</i> , <i>Sow.</i>	... Car. L. ...	Ireland.
<i>Bellerophon hiulcus</i> ...	... Car. L. ...	Ireland.

	Formation.	Locality.
<i>Bellerophon tenuifascia</i> , <i>Phil.</i> ...	Car. L. ...	Ireland.
<i>Bellerophon</i> sp. ...	Car. L. ...	Matlock.

GASTEROPODA.

<i>Cirrus rotundatus</i> , <i>Sow.</i> ...	Car. L. ...	Ireland.
<i>Cirrus spiralis</i> , <i>Phil.</i> ...	Car. L. ...	Yorkshire.
<i>Euomphalus pentangulatus</i> ...	Car. L. ...	Ireland.
<i>Euomphalus</i> sp. ...	Car. L. ...	
<i>Natica plicistria</i> , <i>Phil.</i> ...	Car. L. ...	Preston.
<i>Natica variata</i> , <i>Phil.</i> ...	Car. L. ...	
<i>Loxonema</i> ...	Car. L. ...	Preston.
<i>Metoptoma</i> ...	Car. L. ...	Yorkshire.
<i>Turritella suturalis</i> , <i>Phil.</i> ...	Car. L. ...	Preston.
<i>Pleurotomaria carinata</i> , <i>Sow.</i> ...	Car. L. ...	Ireland.
<i>Pileopsis vetustus</i> , <i>Sow.</i> ...	Car. L. ...	Lancashire.

CEPHALOPODA.

<i>Goniatites Listeri</i> , <i>Martin</i> ..	Car. L. ...	Yorkshire.
<i>Goniatites striatus</i> , <i>Sow.</i> ...	Car. L. ...	Derbyshire.
<i>Goniatites Sphæricus</i> , <i>Martin</i> ...	Car. L. ..	Ireland.
<i>Nautilus biangulatus</i> , <i>Sow.</i> ...	Car. L. ...	Ireland.
<i>Nautilus costalus</i> , <i>Sow.</i> ...	Car. L. ...	
<i>Nautilus bistrialis</i> , <i>Phil.</i> ...	Car. L. ...	
<i>Nautilus carinatus</i> , <i>Sow.</i> ...	Car. L. ...	Yorkshire.
<i>Orthoceras Gesneri</i> , <i>Martin</i> ...	Car. L. ...	
<i>Orthoceras fusiforme</i> , <i>Sow.</i> ...	Car. L. ...	Ireland.
<i>Orthoceras pyrimidale</i> ...	Car. L. ..	Ireland.

PISCES.

<i>Ctenacanthus</i> (spine) ...	Car. L. ...	Clifton.
<i>Psammodus porosus</i> , <i>Ag.</i> (Tooth) ...	Car. L. ...	Clifton.
<i>Orodus</i> (Tooth) ...	Car. L. ...	Clifton.
<i>Strepsodus</i> (Tooth) ...	C. M. ...	
<i>Megalicthys</i> (Scales) ...	...

B. THOMPSON.
T. J. GEORGE.

MEETINGS OF THE SOCIETY.

NOVEMBER.

11th.—Thirteen members and several visitors present. Mr. T. J. George, F.G.S., read a paper on "Belemnites and their position in the Animal Kingdom." Belemnites belong to the class Cephalopoda of the sub-kingdom Mollusca—the highest organisms of the invertebrates, and are placed with the cuttle-fish, the squid, the argonaut, etc., in the order Dibranchiata of that class. The only part of the Mollusc preserved for us, besides the Ink-bag, is the fossilised 'bone,' which was only the terminal portion surrounded by the flesh of the body of the animal. Similar bones are to be found in the other creatures of this class which are still found in our seas, as for instance, the 'sepistaire,' 'cuttle-bone' of the cuttle-fish, the sepia, etc. In the sepia the shell is in a much higher state of perfection, and consists of an oval plate of calcareous matter, and approaches nearest to the shell of the extinct Belemnite. The Ink-bag is sometimes discovered, and rests upon the phragmacone, this was to discolour the water and render the escape from pursuit more secure. The range of the Belemnite in time is from the Liassic period, when they abounded in great numbers, to the Cretaceous.

25th.—Nine members were present. Mr. Harrison, 61, Cowper Street, and Mr. R. B. Perkins, Rutland Cottage, Wootton, were elected members. A fine collection of Birds Eggs was presented to the Society by Sir Herewald Wake, Bart., Vice-President. A unanimous vote of thanks was accorded to Sir Herewald for his handsome gift. A similar vote of thanks was passed to the Rev. S. J. W. Sanders for his present to the Society of 40 numbers of the "Proceedings of the Geologists' Association." Microscopic specimens were exhibited by Messrs. A. Osborne, A. E. Durham, and G. C. Osborne.

DECEMBER.

9th.—Six members present.

23rd.—Thirteen members were present. Mr. T. Phipps, Guildhall Road, was elected a member. A paper was read by the Secretary, "On Snails and their Shells," by Mr. R. Rogers. The paper contained a very lucid and interesting account of Snails, particularly referring to the common Garden-snail, *Helix aspersa*. Its structure, habitat, and mode of locomotion, was thoroughly discussed, and reference was made to its several local names in different parts of the country. The paper closed with superstitions and folk-lore attached to this mollusc.

JANUARY, 1885.

27th.—Nine members and visitors were present. Mr. H. Terry presented to the Society "The British Rainfall for 1882," by Mr. S. J. Symons, and volume 19 of "The Meteorological Magazine." A unanimous vote of thanks was accorded to Mr. Terry. The paper by Mr. F. Law was postponed till the February meeting.

FEBRUARY.

10th—23 members present. Messrs. T. Ashdowne, J. Maddy, and W. B. Oldham were elected members. A paper was read by Mr. F. Law on "Rain : its Formation, Distribution, and Measurement."

24th—The Annual Meeting—31 members present. The general report with balance sheet was presented and read. The officers were elected for the ensuing year. An address was given by the Rev. S. J. W. Sanders, F.G.S., Vice-President, on "Instinct and Intelligence in Animals."

MARCH.

10th—16 members and visitors were present. Mr. C. E. Lucette, B.A., was elected a member. Botanical specimens were exhibited by Messrs. H. N. Dixon and T. G. West. A discussion took place on "Instinct and Intelligence in Animals."

17th—A meeting of the Geological section—Eight members present. Work and excursions for the summer was brought forward.

24th—Eight members present. The Hon. and Rev. T. C. R. Irby, Whiston Rectory, Miss Mayger, and Messrs. J. A. Gotch and C. Dyer were elected members. Specimens with the microscope were exhibited by Messrs. A. Kempson, E. A. Durham, T. Osborne, and H. J. Eunson.



NORTHAMPTONSHIRE NATURAL HISTORY SOCIETY AND FIELD CLUB.



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THE RIGHT HON. THE LORD LILFORD, F.L.S., F.Z.S., &c.

Vice-Presidents.

SIR HEREWALD WAKE, BART.,
REV. S. J. W. SANDERS, M.A., F.G.S., F.M.S., &c.,
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MR. WM. HULL.

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Secretaries.

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<i>Entomology</i>	SIR H. WAKE, BART.....	MR. W. S. GODFREY.
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<i>Ornithology</i>	REV. G. NICHOLSON.	MR. H. P. HENSMAN.
<i>Photography</i>	MR. R. G. SCRIVEN.	MR. H. MANFIELD.

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MR. T. L. CORDEUX, Queen's Cottage ;
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T OF MEMBERS.

refixed ; Corresponding c ; Life L.

road
ne, Chichester
os., St. Paul's road
J. W., Oundle
owne Thos., 23, York road

H Babbington Prof., Cambridge
Baden Miss, Spencer House School
Bailey Thos., Marriott street
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Giles' street
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Giles' street

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 Hemmings Thos., Houghton road
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 Hensman J. B., 52, Sheep street
 Hesleden B., 40, Waterloo
 Hill F., 21, York road
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 H Hinks Rev. T.
 Hinton D. J., 145, Park Crescent
 L Hinton W., Silverstone, near Towcester
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 Hooper Rev. G. B., Courteenhall Rectory
 H Hooker Sir J., Royal Botanical Gardens, Kew
 Hopkinson Rev. W., Sutton Grange, Wansford
 Howes R. Mrs., Spencer Parade
 Howe E. W., H.M. Prison, The Mounts
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 Hull W., 14, St. Giles' street
- Hunt G. E., Wadenhoe House, Oundle
 Huntingford Rev. G. W., M.A., Barnwell Rectory, Oundle
 H Huxley Prof., Science Department, South Kensington
- H Irby Lieut.-Col.
 Irby Hon. & Rev. L.C.R., Whiston Rectory
- c Jecks C., Lyell House, Clevedon, Somersetshire
 Jenkins C., 62, Cowper street
- Keck Powys H. L., Stoughton Grange, Leicester
 Keep A. C., Wollaston, Wellingborough
 Kempson A., 6, Parade
 Kirby F., 114, Abington street
 Kornblau Paul, 2, Alfred street
 Knightley Sir R., Bart., M.P., Fawsley, Daventry
- Law W. A., 11A, Abington street
 Law C., 14, Bridge street
 Law F., 2, Abington street
 Law Sydney, 37, Hazelwood road
 Law W., 49, Gold street
 Lees T. Hastings, 40, Hans place, Sloane street, London
 c Lea H., The Waldrons, Croydon
 Lea Mrs. C., Castilian street
 c Lees F. Arnold, F.L.S., L.R.C.P., 84, Southampton place, Reading
 L Lilford Lord, F.Z.S., Lilford Hall, Oundle
 Loder E. G., Floore House, Weedon
 Longland G., 43, Bridge street
 Loveday W. D., 6, Regent square
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 Manfield H., Cliftonville
 Manfield Jas., 6, Langham place
 Mark Wm., The Drapery
 Markham C. A., Pitsford

Marriott Edwin, Billing road
 Marshall J. H., 3, Guildhall road
 Mayger Miss, 6, Regent square
 McKinnell W., Wood hill
 Milne W. A., 4, St. George's street
 Merrick C. T., Castilian street
 Mobbs C., Fernside, Cliftonville
 Morris W. T., Langford House,
 Buckhurst Hill, Essex
 c Mott F. T., Birstall hill, Leicester
 Moore Rev. E. M., Benefield,
 Oundle
 Mulliner A. F., 82, Bridge street
 Muscott B. B., 8, St. George's
 street
 Muscott, F. B., ditto

 Nethercote H. O., Moulton Grange
 c Newbould Rev. W. W., Montague
 House, Kew
 Newman Mrs., the Rectory, Burton
 Latimer
 Newman S. J., 32, Abington street
 Nicholson Rev. G., B.A., 3, Lang-
 ham place
 Nichols G., The Drapery
 Northampton, Marquis of, Castle
 Ashby

 O'Brien H. de Stafford, Blather-
 wyck Park, Wansford
 Oldham W. B., 71, Denmark road
 Osborne G. C., The Dispensary,
 Albion place
 Osborn Thos., 1, Albion terrace,
 Derngate

 Peachey D. A., The *Mercury* Office,
 Parade
 Pell Mrs. Albert, Hazlebeech Hill
 Percival G. H., M.B., 66, Abington
 street
 Perkins R. B., Rutland Cottage,
 Wootton
 Perry P. P., Waterloo
 Perry Alfred, St. Michael's Avenue
 Pettit G. W., 28, Park road, St.
 James' end
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 tree Grange
 Phipps Mrs. R., Buckenhill, Brom-
 yard, Worcestershire
 Phipps R., jun., Sunnyside,
 Cliftonville
 Phipps Thos., Guildhall road
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 bury place, London

Powys Hon. J., 15, Magdalen
 street, Oxford
 Powys Hon. & Rev. W. Achurch,
 Oundle
 Pursell R., Garryland House,
 Billing road

 Rands G. W., Newland
 Randall H. E., Addison Villas,
 Billing road
 H Ramsay Sir A., Geological Survey
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 Rigby Rev. G. H., M.A., Yardley
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 Rogers Robt., Hampton-in-Arden,
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 Sanders Rev. S. J. W., F.G.S.,
 etc., School House, Abington
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 Scriven Geo., Castle Ashby
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 c Shepherd T., Kingsley road,
 Chester
 Sheppard Miss Lucie, 1, York road
 Shoosmith W. B., Billing road
 Simpson Wm., 71A, St. Giles'
 street
 Slater Rev. H. H., F.Z.S., Irchester
 Vicarage, Wellingborough
 Smith Mrs. W. H., Sheep street
 Smith C. B., 6, Regent square
 Smith W. A., Heyford Iron Works,
 Weedon
 Stimpson W. E., 3, Elysium terrace
 Singleton H., Preston Deanery

 Tarpley Edward, Little Brington
 Tarry Isaac, 58, York road
 c Taylor Dr., Lewisham High road,
 Deptford
 Terry William, Billing road
 Terry Henry, 52, Hazelwood road
 Thompson B., F.C.S., F.G.S., 55,
 Victoria road
 Thurnam Dr. F. W., Yardley
 Hastings
 Todd H. W., Bridge street
 Tomalin Wm., 24, York road
 Tomalin R., ditto
 Tomalin H. F., ditto
 Turner T. G., Ingestre House,
 Billing road
 Turner W. H., Carlton House,
 Billing road

Turner E., The Lindens, Clifton- ville	West T. G., 9, Aberdeen terrace, Dallington road
Tye E., Gold street	Wigg Rev. S. W., 10, Hazelwood road
Vials T. H., Billing road	Wigelsworth Lionel W., Castle- thorpe
Wake Sir Herewald, Bart., Courteenhall	Williams Miss, 64, Waterloo
Walker W. H., Bugbrooke	Wilson John, Albion place
Waller Rev. Horace, Twywell	Wood Rev. F. H., St. Paul's Vicarage, Kingsthorpe road
Rectory, Thrapston	Wright F., St. Giles' square
Wells W. R., Ladies' lane	

NOTE.—Where no town is mentioned Northampton to be understood.

The above List is corrected to April, 1885.

LAWS.

1. NAME.—That the Society shall be named “The Northamptonshire Natural History Society and Field Club.”

2. OBJECTS OF THE SOCIETY.—The objects of the Society are to encourage a taste for Natural History, and to facilitate its study by meetings for the reading of papers, the exhibition of specimens, the formation of a library and museum, and the record of the Natural History facts of Northamptonshire.

3. CONSTITUTION.—The Society shall consist of Honorary, corresponding, life, and ordinary members.

4. HONORARY AND CORRESPONDING MEMBERS. — Individuals distinguished for their researches in Natural Science, for their liberality to this Society, or for other reasons, may, on the recommendation of the Committee, be elected honorary or corresponding members of any general meeting.

5. LIFE MEMBERS.—Any person may become a life member on the payment of Five Guineas, or of books or apparatus of that value. All amounts thus obtained to be set aside for a special fund.

6. ELECTION OF MEMBERS.—New members may be nominated in writing, by a proposer and seconder, at any meeting of the Society, and the names shall be read from the chair—their election shall take place at the next meeting by show of hands, or, if demanded, by ballot.

7. PRIVILEGES AND DUTIES OF MEMBERS.—Every member shall be admitted to all meetings of the Society, and have the use of all books, specimens, and instruments, subject to such conditions as the Committee

may determine. He may also introduce two friends to the Society's meetings who shall not, however, take part in the proceedings, except by permission of the chairman.

8. **SUBSCRIPTION.**—The annual subscription shall be Ten Shillings, due the first day of January in each year, until resignation, or declaration of forfeiture of membership; but the members of the Science Classes may become annual members on payment of 2/6 per annum so long as they continue to be members of the Science Classes; but they shall not be entitled to the Journal. The Committee shall have power to declare that any member, whose subscription is twelve months in arrear, shall cease to be a member of the Society.

9. **MEETINGS AND ORDER OF BUSINESS.**—

1. The meetings shall be of two kinds—ordinary and sectional—and there shall be field days in May, June, July, and August if possible.
2. General meetings shall be held on Thursdays, at least once in October, November, December, January, February, and March; and sectional meetings shall be held on alternate Tuesday evenings throughout the year. The meetings shall be open to all members of the Society. A printed notice of papers to be read at the general meetings shall be sent to every member.
3. The course of business at all general and sectional meetings shall be :—
 1. Confirmation of minutes of previous meeting.
 2. Ballot for members previously proposed.
 3. Proposal of new members.
 4. Miscellaneous business.
 5. Reading of papers.
 6. Exhibition of specimens.

10. **FORMATION OF SECTIONS.**—Each section shall consist of not less than six members, who shall elect their own officers. A section may be formed upon the written requisition of not less than six members, addressed to the Committee, who shall decide whether it be in the interest of the Society that such section be formed.

11. **OFFICERS.**—The officers of the Society shall consist of a President, four Vice-Presidents, one or more Secretaries, a Treasurer, and the Presidents and Secretaries of Sections.

12. **DUTIES OF PRESIDENT AND VICE-PRESIDENTS.**—The President shall be in virtue of his office the Chairman of the General Meetings of the Society and of the Committee. The senior Vice-President present shall take the Chair in the absence of the President.

13. DUTIES OF SECRETARIES.—The Secretaries shall record in the Transaction Book the transactions of the Society at all its meetings, and in the Minute Book the transactions of the Committee; shall conduct the business of the Society, and prepare an annual report.

14. DUTIES OF TREASURER.—The Treasurer shall receive all sums due to the Society, and make all payments authorised by the Committee. He shall keep an account of all his receipts and payments in the Society's Cash Book, which accounts shall be balanced annually, examined by two auditors, and presented at the annual meeting. The Treasurer shall also keep a register of the names and addresses of all the members of the Society.

15. DUTIES OF LIBRARY COMMITTEE.—They shall have charge of the library and specimens belonging to the Society, in accordance with such bye-laws as the Committee may determine, and shall report at the annual meeting as to the state of the property under their care.

16. COMMITTEE.—The management of the affairs of the Society and the administration of its funds shall be vested in a Committee, consisting of seven members of the Society and of the officers, who shall be *ex-officio* members of the Committee. The election shall be conducted as follows:—

Any member may nominate a member to serve on the Committee, in writing, to the Secretaries at least one week before the annual meeting; and a list of these members, and the members of the retiring Committee, who are eligible for re-election, shall be printed, and a copy given to every member at the annual meeting, who shall mark the names of the seven members for whom he votes. All members of the Committee shall retire from office every year, and those members only shall be eligible for re-election who have attended at least four Committee meetings during their year of office.

The Committee shall meet on the first Tuesday in every month, or at such other times as may be necessary. Five members shall form a quorum.

They shall purchase such books, specimens, &c., as they may think desirable; examine all accounts and authorise their payment, and conduct the general business of the Society.

The Committee shall have power to fill up any vacancy occurring in their body or in the list of officers.

17. AUDITORS.—At the meeting next preceding the annual general meeting two members, not on the Committee, shall be appointed, who shall audit the Treasurer's accounts.

18.—ANNUAL MEETING.—The annual meeting shall be held in February, when the report of the proceedings of the past year shall be read, the Treasurer's audited accounts be submitted, the Committee and officers for the ensuing year be elected, and other business relating to the interests of the Society be transacted.

19. **MODE OF VOTING.**—All votes shall be taken by show of hands, or, if demanded by ballot, except in cases otherwise specially provided for in these laws.

20. **ALTERATION OF LAWS.**—No alteration of these laws shall be made except at the annual meeting of the Society; and any proposed alteration must be read from the Chair at the next previous ordinary meeting, and the particulars of such alteration shall be inserted in the notice calling the annual meeting.



LIBRARY BYE-LAWS.

I.—That any member detaining any Books, etc., for a longer period than one month (28 days), be fined One Penny per week until returned.

II.—That any member returning a Book may take it out again if no other member has made an application for it.

III.—That every member shall be responsible for any book lent to him, and, if lost or damaged, shall make reparation.

IV.—That the Library shall be closed for the fortnight previous to the annual meeting, and that any member keeping a Book after the day appointed for closing the Library, be fined One Shilling.

V.—That no member shall retain any Periodical for a longer period than one week, until two months after the date of publication.

VI.—That certain Books of Reference, to be named by the Committee, shall not be taken away until the close of any meeting, and must be returned ere the opening of the next meeting. Any member infringing this Rule to be fined Threepence each time.

VII.—No Books, Periodicals, etc., may be taken from the Library except under the supervision of the Library Committee; and any member wishing to borrow a Book, etc., must signify his wish to one of the Library Committee at any meeting of the Society, who shall enter the name of the member, particulars of the Book, etc., and date of such loan, in a book kept for the purpose.



CATALOGUE OF BOOKS.

(Corrected to April, 1885).

*Album of Photographic Views.

Botanical Garden, The.

Braithwaite, R. British Moss Flora. 7 parts.

Caird J. English Agriculture in 1850 and 1851. 1852.

Chapuis and Delvaque. Atlas of Plates.

- Damon, R. Handbook to the Geology of Weymouth. 1860.
 „ Supplement to the Handbook to the Geology of Weymouth. 1864.
 Davy, Humphry. Elements of Agricultural Chemistry. 1839.
 *Dresser, H. E. History of the Birds of Europe. 9 vols. 1871-1881.
 Donn, J. Hortus Cantabrigiensis. 1826.
 Francis, G. W. An Analysis of British Ferns and their Allies. 1842.
 *Gould, John. Birds of Great Britain. 5 vols. 1862-1873.
 Gray, R. Birds of the West of Scotland. 1871.
 Griffith & Henfrey. Micrographic Dictionary. 2 vols. 1875.
 Holiday Rambles of a Naturalist.
 Hooker's British Ferns.
 Hughes, W. R. Principles and Management of Marine Aquarium.
 Ibis, The. A Magazine of General Ornithology. 20 vols. 1859, etc.
 James, T. The History and Antiquities of Northamptonshire. 1864.
 Jeffreys. British Conchology. 1862.
 Johnson, J. F. W. Notes on North America. 2 vols. 1851.
 „ „ On Uses of Lime in Agriculture. 1849.
 „ „ Chemistry of Common Life. 2 vols. 1856.
 „ „ Lectures on Agricultural Chemistry. 1844.
 †Jukes, J. Beete. Students' Manual of Geology. 3rd ed. 1872.
 Kirby & Spence. Entomology. 1856.
 Knipe. Geological Map of England. 1880.
 Liebig's Organic Chemistry of Physiology and Pathology. 1st ed. 1842.
 „ Organic Chemistry of Physiology and Pathology. 2nd ed. 1842.
 „ Chemistry, in its application to Agriculture and Physiology. 1847.
 „ Principles of Agricultural Chemistry. 1855.
 †Lowe, E. J. Our Native Ferns. 1865.
 Lubbock, J. Various Papers, etc., bound in 1 vol.
 Lycett, J. The Cotteswold Hills. 1857.
 Lyell, Chas. Elements of Geology. 6th ed. 1865.
 †Mivart, St. Geo. The Common Frog. 1874.
 † „ Lessons from Nature.
 ‡Mott, F. T. Fruits of all Countries. 1883.
 †Molloy, G. Geology and Revelation. 1872.
 *Morton, John. The Natural History of Northamptonshire. 1712.
 The Naturalists' Miscellany or coloured figures of natural objects. 14 vols.
 Northamptonshire Natural History, Journal of the. Vol. 1.—1880-81
 Vol. II.—1882-83.
 Nesbit, J. C. On Agricultural Chemistry. 1856.
 Ormerod, E. A. Manual of Injurious Insects. 1881.
 Ralph. Icones Carpologicæ. 1849.
 Reeve. British Land and Fresh Water Mollusks. 1863.

- Reynold. Geological Atlas of Great Britain.
 Sharp, S. Rudiments of Geology. 1st and 2nd editions. 2 vols. 1875-76.
 „ Sketch of the Geology of Northamptonshire. Tract. 1874.
 Simond's Rot in Sheep. 1880.
 Slack, H. J. Marvels of Pond Life. 1861.
 *Sowerby's English Botany. 6 vols.
 Symond's Rainfall. 8 vols. 1873-81.
 Taylor, J. Geological Essays. 1864.
 Thompson, T. On Heat. 1840.
 Tull, J. The Horse-Hoeing Husbandry. 1733.
 Warner, R. Pantæ Woodfordensis. 1771.
 Watson, H. C. Geography of British Plants. 1835.
 Whewell, W. Astronomy and Physics considered with reference to Natural Theology. (Bridgewater Treatise). 1837.
 Woodward, S. P. A Rudimentary Treatise of recent and Fossil Shells. 1844.

*PALÆONTOGRAPHICAL SOCIETY'S PUBLICATIONS, FROM COMMENCEMENT
 IN 1847 TO 1884.

RAY SOCIETY PUBLICATIONS.

Cameron, E. A Monograph of the Phytophagous Hymenoptera. Vol. 1.

JOURNALS, TRANSACTIONS, AND REPORTS RECEIVED FROM NATURAL HISTORY SOCIETIES.

- Bound Vol. of Natural History Society Reports — Croydon, 1873-78 ;
 Geology of Croydon ; North Staffordshire, 1877 ; Bedfordshire, 1875-77 ;
 Leeds, 1875-77 ; Nottinghamshire Naturalists' Society, 1877.
 Norfolk and Norwich Naturalists' Society. Vols. 1, 2, and 3. 1869-83.
 North Staffordshire Natural History Society. 1 vol. 1870-75.
 Essex Field Club. Vols. 1, 2, and 3. 1880-84.
 Rugby School Natural History Society. 1 vol. 1878-82.
 Also, the following which are not yet bound :—
 Bedfordshire Natural History and Field Club. (1 No.) 1877-81.
 Birmingham Natural History and Microscopical Society. (4 Nos.)
 1869 and 1880-82
 Burton-on-Trent Natural History and Archæological Society. (2 Nos.)
 1879-80.
 Chester Society of Natural Science. Proceedings. (1 No.) 1878.
 „ „ „ Reports. (4 Nos.) 1879-83.
 Croydon Microscopical Club. (3 Nos.) 1872. Also 1878-83.
 Essex Field Club. 1883-4.

Glasgow Natural History Society, Proceedings of. Vols. 2, 3, and 4.
 Hertfordshire Field Club.
 Manchester Scientific Students' Association. (1 No.) 1878.
 Norfolk and Norwich Naturalists' Society. (14 Nos.) 1880 to 1882.
 North Staffordshire Naturalists' Field Club and Archæological Society.
 (3 Nos.) 1881-83.
 Nottingham Literary and Philosophical Society. (2 Nos.) 1879-81.
 Nottingham Naturalists' Society. (1 No.) 1881.
 Perthshire Society of Natural Science.
 Peterborough Natural History Society. (2 Nos.) 1881-83.
 South London Microscopical and Natural History Club. (2 Nos.) Map
 of District. 1883.
 Yorkshire Naturalists' Union Transactions. Parts 1 to 6.
 Yorkshire Philosophical Society. Annual Report for 1883.

MAGAZINES AND JOURNALS.

Bound Vols :—

British Association Reports. 1835-42-43, and 45.
 Entomologist. 3 vols. 1878, 1879, and 1881-82.
 Geological Magazine. 13 vols. 1866-70 and 1876-83.
 Geologist. 1 vol. 1862.
 Journal of Society of Arts. 1 vol. 1860.
 Journal of Botany. 1876-77-78, and 1881.
 Meteorological Magazine—Symond's. 2 vols. 1875-82.
 Midland Naturalist. Vol. 1. 1878.
 Microscopical Journal. 2 vols.
 Nature. Vols. 18, 19, 20.
 Popular Science Review. Vols. 11, 13, 14, 15, 17.
 Zoologist. Vol. 1. 1877.

Unbound Vols. :—

Entomologist. Monthly.
 Zoologist.
 Journal of Botany.
 The Science. Monthly.
 Science Gossip.
 Geological Magazine. Monthly.
 Midland Naturalist. „
 Nature. Weekly.
 British Association Reports.
 The Quarterly Journal of Microscopical Science. No. 89. 1883.

PAMPHLETS.

- History of Rothwell. P. Cypher. 1869.
 ‡Local Land and Fresh Water Shells. Dodd & Mussum, Nottingham. 1881.
 London Catalogue of British Plants. 1871, 1883.
 " " " Mosses. 1877.
 Meteorology of Croydon. G. Corden. 1878.
 Notes on the Flora of Northamptonshire. Druce.
 ‡On Shephardella. Liddall. 1880.
 ‡On the Quartzite Pebbles in the Drift. W. J. Harrison. 1882.
 ‡On a Deep Boring at Northampton. H. J. Eunson, F.G.S. 1883.
 ‡On the Permians of the North East of England. E. Wilson, F.G.S. 1876.
 Parrots of Victoria. T. A. Forbes, Leith. 1883.
 ‡Presidential Addresses to the Geological Society of London. B. Etheridge, Esq., F.R.S. 1881 and 1882.
 ‡Report on the Fisheries of Norfolk. By Frank Buckland. 1875.
 ‡The Keuper Basement Beds. E. Wilson and J. Shipman. 1879.
 A Bound Volume of Papers on Agriculture. By Voelcker and others.

The following books and pamphlets have been presented to the Society during the last year:—

- ‡Field Notes in Norway in 1882. Rev. H. H. Slater.
 ‡The Island of Rodrigues and its Fauna. Rev. H. H. Slater.
 ‡The Ornithology of Riding Mill and its neighbourhood. Rev. H. H. Slater.
 ‡On a Tumour of the Ovary in the Common Pheasant. Rev. H. H. Slater.
 ‡On a new genus of Pycnogon from Japan. Rev. H. H. Slater.
 Authenticated List of the Mollusca of Northamptonshire. Presented by Mr. W. D. Crick.
 ‡A List of the Diurnal Birds of Prey. By J. H. Gurney, F.Z.S.
 The Cobham Journals, by Miss Molesworth. Presented by the Rev. S. J. W. Sanders.
 Vols. 4, 5, 6, 7, and 8 of the Proceedings of the Geologists' Association. Presented by the Rev. S. J. W. Sanders.
 The Botanic Garden. Presented by Mr. J. Wilson.

* Books marked with an asterisk are works of Reference only, and are not allowed to be taken from the Library.

† Lent by the Rev. Canon Scott.

‡ Papers presented by the Authors.

ANNUAL REPORT, 1884.

IN presenting the ninth annual Report, your Hon. Secretaries beg to congratulate the Society upon retaining its good position. We have now on our books 222 members, which are divided as follows :—185 paying 10/-, three paying 5/-, 22 honorary and life members, and 12 corresponding members. During 1884, 34 new members have been elected, and we have lost by withdrawal and other causes 15, showing a net increase of nearly 20 members.

Meetings.—The fortnightly evening meetings have been carried on as usual, with the exception of three summer months, when the microscopical evenings were discontinued. We commenced after the annual meeting last year with giving up one evening a month to the microscopical section ; these evenings were certainly well attended at first, but we are sorry to say that the attendance fell off considerably towards the end of the year, and we wish to express regret that this should be the case, as it is but poor encouragement to the members who kindly bring their microscopes to find that there are only two or three members to inspect the various objects. Now as microscopy is becoming more used in every branch of natural science, we trust that some definite work will be taken in hand by the microscopical section this year. There has been a fair amount of work done in botany, geology, and meteorology, but ornithology exists only in the grand works presented to us by our noble President and in the notes published by Mr. H. F. Tomalin in the Journal, and the entomological section appears to be defunct or in a state of hibernation. But the great success of the year, although not under the immediate auspices of our Society, has been connected with the photographic section, we mean the exhibition of photographs, held in the old museum room ; to the prominent members of this section it is that the chief credit is due—the Rev. S. J. W. Sanders being the originator of the movement and Mr. H. Manfield the prime mover—to whom we beg to offer our hearty congratulations upon the success of the exhibition. But the sections altogether do not appear to be doing the amount of work they might do ; there is one thing your Hon. Secretaries would suggest, viz., that each secretary of a section should be provided with a book, in which to register the names of the members of the sections and to record the work done by each section.

Since the last annual meeting eleven papers and lectures have been delivered to the Society :—

April 22nd . Mr. J. Gregory, on " Pond Life."

May 6th ... Mr. H. N. Dixon—" Abnormal reproduction in Mosses."

July 8th ... Mr. B. Thompson—On " the Fish and Insect Beds in Northamptonshire."

Oct. 21st .. Mr. C. E. Crick—" The Structure of Leaves."

	{	Sir Herewald Wake.
Oct. 28th ..		Mr. W. J. Harrison—" The Ice-Age and the Stone-Age."
Soirée.		Rev. R. Baker—" The Romans in Northants."
		R. G. Scriven, Esq.—" The Saxons and Danes, with a few words about Danes' Camp."

Nov. 12th ... Mr. T. George—" Belemnites and their place in the Animal Kingdom."

Dec. 23rd ... Mr. R. Rogers—" Snails and their Shells."

Feb. 3rd ... Mr. F. Law—" The Formation, Measurement, and Distribution of Rain."

Excursions.—During the summer four excursions were arranged :—

June 12th ... To Yardley Chase and Castle Ashby.

July 21st ... To Kirby Hall, Deene Park, and Morehay Lawn.

Aug. 21st ... To Althorpe House and Park.

Sep. 4th ... To Flore House.

In additions to these excursions were the evening walks of the botanical section, which we hope to see continued this summer and attended by a larger number of members and friends.

The soireé was held in the Grammar School on October 28th, and was well attended.

Journal.—With 1884 we commenced the third volume of our Journal, which still keeps up its reputation, and which is considered to be one of the best provincial Journals published. We welcome to the list of contributors Mr. H. N. Dixon, a botanical worker of no mean calibre.

The library has been increased by several gifts and by publications of other societies received in exchange for our own. We have to thank Lord Lilford for several volumes of the *Ibis* ; The Rev. S. J. W. Sanders for numerous numbers of the proceedings of the Geologists' Association ; and Mr. H. Terry for the Meteorological Magazine. Although we possess a very valuable library it is not used nearly so much as it ought to be, for out

of more than 130 members who reside in the town, in 1884 only 17 members used it, borrowing 37 books.

Your delegates—Mr. Thompson and Mr. George—attended the Midland Union Meeting at Peterborough. Several other members of our Society were there, and we have no doubt they thoroughly appreciated the re-union. We think that it was a great pity that so few of our members took advantage of the nearness of the meeting, for both your delegates felt that much pleasure, as well as mutual improvement, is to be gained by comparing notes with workers from a distance.

After expressing their sense of the loss of the services of your late Hon. Secretary, Mr. S. J. Newman, under whose management the Society grew and prospered for two years, your Hon. Secretaries would conclude their report with a hope that the Society has entered upon another successful year, and they trust that all the members will try to do something for the interests of the Society, more than the mere payment of their subscriptions. Active workers are wanted, for there is a large scope for work throughout the country in nearly every branch of Natural History.

THOMAS J. GEORGE,
THOS. L. CORDEUX,
HENRY JOHN EUNSON.



SUGGESTIONS.

Suggestions and Communications for the Journal will be thankfully received by the Editorial Committee. They may be sent to the Rev. S. J. W. SANDERS, The School House, Northampton.

Members should bear in mind that Subscriptions are payable in advance, on the 1st of January in each year, to the Treasurer, Mr. B. HESLEDEN, at the Banking Company Limited, Parade, Northampton, and, that by order of the Committee, the Journal will only be forwarded to those Members whose Subscriptions have been paid.

Any complaint as to irregularity in the receipt of the Journals should be sent at once; by the Country Members to Mr. R. G. SCRIVEN, Castle Ashby, and by the Town Members to Mr. H. J. EUNSON, 20, St. Giles' Street, who will also be glad to receive applications for the first Vol. of the Journal, of which a limited number remain in stock; these will be issued to Members at the price of 12/- unbound, or 15/- bound appropriately in half-calf.

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AN OLD MANOR HOUSE AT HARDWICK.

NORTHAMPTONSHIRE
NATURAL HISTORY SOCIETY, AND FIELD CLUB.

No. 1. 1871. 25.

NOTES ON THE BIRDS OF NORTHAMPTONSHIRE.

BY EDWARD HILL.

THE COMMON OR GRAY PARTRIDGE, *Perdix perdix*.

This well known and most useful British game bird is distributed of from every part of the county, and it is doubtless the most numerous of all the birds of the country. It is not already far like to our native quail, but it has been, since our custom of shooting has increased, almost exterminated. Of this species, it is almost certain that the English has no native subject which merits so many elegant and curious illustrations as it has in our own country. In many parts of the county, and especially in the north, the Partridges of our fields feed and take to the corn, and even to feed principally upon the seeds of the cereals, growing in such small quantities as they can find under a labour, the great husbandry which makes our pasture fields. In a mild February, and some times even later, our Partridges pair, though they seldom lay before the third week of April. During March and the early part of April, these birds seem to leave the young corn more than at any other season; but when they begin to lay, it would be somewhat hard to name any place in the county but may not be selected as a site for the single scratching and low heavy scratching systems which form the nest. In a dry season partridges commonly select the meadow-larks and the rough patches of weed along the ditch-sides, but standing corn, mowing grass, and clover are all likely resting-places, and in wet seasons many broods are saved by the selection of one of the fern-leaves by the parent birds. The general character of the soil of the part of Northamptonshire is so heavy for a first rate Partridge country, the essentials for which are a light soil, a combination of arable and pasture, cultivated land, and a good water-supply; but in a good season, and in a very fair sort in the neighbourhood of Lilford in September and October, though of course, as in other places, our total bag depends to a very great extent, upon the amount of covert. In the old days, when the sportsmen and pointers we used to consider from fifteen to twenty as



NORTHAMPTONSHIRE
NATURAL HISTORY SOCIETY & FIELD CLUB.

No. 23. August, 1885.

NOTES ON THE BIRDS OF NORTHAMPTONSHIRE.

BY LORD LILFORD, F.L.S.

116. COMMON OR GREY PARTRIDGE. *Perdix cinerea*.

This well-known and most worthy bird has been so often and so fully treated of from every point of view, that it is difficult for us to write anything that is not already familiar to our readers; but we confess that having been, since our earliest shooting-days, especially devoted to the pursuit of this species, it is almost equally difficult to abstain from dwelling upon a subject which recalls so many pleasant memories and incidents connected with our own county. In an average January, when the turnips are no more, the Partridges of our neighbourhood take to the grass-lands, and seem to feed principally upon the ends of the tender grasses and such hedge-berries as they can find under and about the great thorn-fences which separate our pasture-fields. In a mild February, and sometimes even earlier, our Partridges pair, though they seldom lay before the third week of April. During March and the early part of April these birds seem to frequent the young corn more than at any other season; but when they begin to lay, it would be somewhat hard to name any place in the country that may not be selected as a site for the simple scratching and few leaves and grass-stems which form the nest. In a dry season Partridges certainly prefer our meadow-lands and the rough patches of weed along the ditch-sides, but standing corn, mowing grass, and clover are all likely nesting-places, and in wet seasons many broods are saved by the selection of our old dry fence-banks by the parent birds. The general character of the soil of our part of Northamptonshire is too heavy for a first-rate Partridge country, the essentials for which are a light soil, a combination of arable and uncultivated land, and a good water-supply; but in a good season we can show very fair sport in the neighbourhood of Lilford in September and October, though of course, as in other places, our total bag depends, to a very great extent, upon the amount of covert. In the old days of muzzle-loaders and pointers we used to consider from fifteen to twenty brace of

Partridges a fair day's bag for two guns, and often went home happy and contented after a good hard day's walking with less than that amount of birds ; but now-a-days, except in unusually good seasons for grass, we have no work for pointers, as our corn-lands are laid bare of any covert by the mowing-machines : in thin turnip-crops the birds are wilder than anywhere else, and in good thick "root" crops a quartering dog disturbs more game than he helps to find ; besides this the rapid loading of the present sporting guns hardly admits of the perfection of dog-breaking, and an unbroken dog of any kind is the greatest nuisance with which a Partridge-shooter can be cursed. In these circumstances we are forced to adopt the "walking-up" system, and having thereby put our birds into some kind of covert, we divide our forces, and whilst a certain number of the guns walk with the beaters, the remainder go forward, and concealing themselves as best they may behind a fence in the expected line of flight, deal with the birds as they "come over" to the best of their ability. In this way we make fair bags of Partridges ; and as the old birds lead the coveys, and are therefore the first to suffer, we are strongly of opinion that this method of shooting tends to the increase of the species, as a superfluity of two- or three-year old birds is certainly "bad for the breed," and in the neighbourhood of Lilford the number of Partridges has increased in a very remarkable manner since we took to driving, in spite of several most disastrously unfavourable seasons. Our Partridges have innumerable enemies, of which a wet hatching-time is undoubtedly the worst ; but straying and hunting dogs who put the sitting birds off their nests, and mowing machines which mangle and immolate old, young, and eggs by dozens, rats, foxes, stoats, all the members of the genus *Corvus*, to whom eggs in any state seem an irresistible temptation, and Sparrow-Hawks, who will clear off a whole brood of young birds in a very few days, to say nothing of idle and thieving lads—all have to be taken into consideration by those who, like ourselves, have been and are more anxious about our breed of Partridges than any other game. It is rather the custom of gamekeepers to put every thing down to "them cursed foxes ;" but although a vixen with cubs has an undoubted predilection for Partridge eggs on the point of hatching, we have very good reason to believe that many delinquencies now laid to the charge of this sacred quadruped are really to be attributed to other and more abundant vagabonds. We have omitted the cat, the weasel, the hedgehog, and the snake from the above list of foes to the Partridge, as the first does not, to our knowledge, destroy eggs, the second amply compensates for any harm done to game by the destruction of mice and young rats ; against the third we have never personally been able to prove the charge of egg-stealing ; and Snakes are not sufficiently common in our neighbourhood to do any appreciable amount of mischief by terrifying the hen bird from her eggs and causing her to forsake them, as is frequently

the case in localities in which these reptiles are abundant. We consider from sixteen to nineteen about an average complement of eggs for the present species, and are inclined to look upon the frequent instances of twenty-five or thirty eggs, as the layings of two birds in one nest. Before the full complement is laid the bird will often cover her eggs with a few dry leaves, and we have several times been puzzled by this device in finding a previously discovered nest on a second visit. Many authentic instances are on record in which Partridges have been known to move their eggs from dangerous situations. In an average season, we consider from about the 16th till the end of June as the critical hatching-time. In one instance in which we had special facilities for observation, from the fact of the nest being situated in a flower-bed close to the house at Lilford, one egg in a laying of seventeen was cracked on the morning of June 18th, and on the afternoon of the 21st seventeen young birds had come safely into the world: in this case the male bird was in a constant state of anxiety during the process of hatching, and ran to and fro on the stone balustrade which surrounds the flower-garden, calling loudly at all hours of the day. Both the parent birds will show great courage in attacking dogs, cats, or any winged enemies who may approach their tender young; but we have never been personally attacked by a bird of this species, as we have by a pair of Virginian Colins (*Ortyx Virginianus*), who had just hatched near a footpath not far from Lilford. We may here mention that in spite of various attempts to establish this latter species in our county and many other parts of England, as well as in Scotland and Ireland, our efforts have all ended in failure, as the Colins after doing well and breeding freely in many cases for two or three seasons, eventually disappeared entirely. To return to our Partridge: happy is the covey hatched off in our old pasture-lands, remote from footpaths, with an abundant supply of ants and their eggs at hand, and a disused and broken ant-hillock on which to take its frequent dust-baths; no need to resort to roads for that purpose, or to the corn-lands for food, and safe from all but natural enemies till September. These grass-bred birds seldom voluntarily leave the grass-lands except when hatched in the immediate neighbourhood of corn, to which, in such cases, they resort to feed soon after daybreak and again in the evening; but we feel sure that a very considerable number of our Lilford Partridges never touch grain at all. Besides all kinds of grain and many "green stuffs," Partridges are great devourers of insect in all stages of development, and do infinite service to the farmer; in fact this bird is desirable from every point of view—beautiful in shape and plumage, super-excellent as food, affording healthy exercise and inexpensive sport to great numbers of all classes, the Partridge is in our opinion, the most worthy of protection of any of our British birds; and even its call, though not strictly speaking musical, defies imitation, and has

a peculiar and indefinable charm to all lovers of the country. To keep up a healthy stock of Partridges a change of blood is absolutely necessary, and we have at Lilford turned out at various times a considerable number of birds imported from Hungary and Bohemia, with very great advantage. As is well known, Partridges are by no means difficult to rear by hand, and thrive well upon a diet of ants' eggs, curds, seeds, and green food ; but these hand-fed birds are liable to various maladies from which their wild relations seem to be exempt, and from their tameness and habit of running and rising all together, never show the same sport as the wild natives aforesaid. The past season of 1884 was decidedly the best for Partridges in our neighbourhood since 1859, and our total bag on our own shootings was larger by more than 400 birds than in any season of which we have any record. We cannot say how we shall be borne out by meteorological observation when we state that in our experience good and bad Partridge-seasons occur in cycles ; for instance, with us at Lilford 1850 was a fairly good season, 1851 a better, and 1852 superlatively excellent ; the three following years were all exceedingly bad, till in 1855, to use a common expression, we had no birds at all, and on the 1st of September of that season my brother and myself walked over some of our best farms with good pointers and only saw five birds. In the following two seasons of 1856 and 1857, which were both of them favourable, our Lilford Partridges re-asserted themselves, and in 1859 the country was swarming with them ; then followed a cycle of bad and indifferent seasons, till 1868, a year of extraordinary drought, but many birds, since which period we had a majority of bad seasons till 1878 ; then a fairly good one, three bad, and three decidedly good. On the light stony soils to the south and south-east of Stamford we have occasionally found Partridges in numbers which would compare favourably with the best districts of Norfolk, and enjoyed the cream of shooting in the muzzle-loading days, but the details of the season, as above related, refer to our own Lilford shootings exclusively. We have occasionally enjoyed fair sport at Partridges with the Hawks of our " Old Hawking Club ;" but our district is by no means a good one for that form of sport, owing to the abundance of thick fences, woods, and plantations. The Grey Partridge seldom perches ; but we once in Lancashire saw five alight upon the roof of a cottage, and one of the gamekeepers at Lilford assured us that in August of last year (1884) he saw some eight or nine of these birds upon the top bar of a field-gate near Achurch. The partiality of Partridges for the neighbourhood of roads and well-used footpaths as a nesting-site is well known, and is probably owing to the facilities afforded by such spots for " busking" or dusting themselves. We have heard of an instance in which the clerk of a parish in one of our eastern counties gave notice during a Sunday morning's service that the rector requested his congregation not to use the usual approach to the church on account of a

Partridge sitting on her nest close thereunto. The Partridge sits very closely and constantly, but will easily desert her eggs if suddenly startled by a dog. These birds do well and thrive for long periods in a well kept aviary, but instances of their breeding in captivity appear to be very few and far between. Our Partridge is found more or less abundantly throughout Central and Northern Europe, but it is not met with in any of the large islands of the western Mediterranean, and in Spain appears to be confined to the mountain ranges of the north and north-west; we have met with it in Aragon and in Santander, generally high up on grassy plateaux in the hills. Varieties of the Partridge are not uncommon, though we personally have met with very few of them: we occasionally, on one particular beat near Lilford, meet with birds in which the horse-shoe on the breast, so characteristic of the species, is of a deep bronze colour instead of the usual dark chestnut, and now and then with individuals in which this marking is white. We have never been able to verify the accounts given by various authors of the more or less regular migrations of the Grey Partridge in the south of Europe, but have ascertained, to our own satisfaction, that it does not exist in many localities in which it has been recorded as abundant, amongst others Sicily, Sardinia, and North Africa. In the eastern portions of European Turkey, bordering the Adriatic, this species is curiously local, and many ardent sportsmen of our garrisons of the Ionian Islands, before their unhappy cession to Greece, were in the habit of shooting constantly on the mainland of Epirus and Albania without even meeting with what we fondly call the *English* Partridge; but the bird is, or was, nevertheless, fairly abundant in certain localities at no great distance from Corfu, and other of these former most pleasant quarters of the British soldier. We have heard in our own county and elsewhere of hybrids between the Grey Partridge and the Red-legged *Caccabis Rufa*; but the only one of these supposed hybrids which we ever personally examined proved to be a specimen of the so-called Grey Partridge of India, *Francolinus ponticerianus*, and we have yet to be convinced that our Partridge ever contracts alliances out of his own kindred.

117. RED-LEGGED PARTRIDGE. *Caccabis Rufa*.

The earliest occurrence of this species in North Northamptonshire with which we are acquainted is that of a specimen killed by the late Rev. George Stopford, near Bulwick: we have no exact record of the date, but remember seeing the bird at Bulwick Hall, stuffed and mounted, on the occasion of our first visit to that house, now more than forty years ago. The first Red-legged Partridges that we ever saw in a wild state in the district of which we are treating in these notes were on a rough fallow in the immediate neighbourhood of Elton, Hunts, about the year 1850. We found that their existence there was well known to Lord Carysfort's game-

keeper, who accompanied us on this occasion, and informed us that he had known of a covey or two on the manor annually for many years before the date above given. About the year 1860 we killed one or two on our own shootings at Lilford, and heard of several occurrences of the species in our neighbourhood; and since that date the "Frenchman," as the bird is commonly called, has firmly established himself at all events in the northern division of our county, and at Lilford we and one of our neighbours have at various times added to our own stock by importations, chiefly from the eastern counties. Most of our readers are probably aware that this bird is not an indigenous British species, the main importation, according to Yarrell, having been made about the year 1770 by the Marquis of Hertford and Lord Rendlesham, who turned out a considerable number of Red-legs, hatched from eggs obtained from the continent, on their estates in Suffolk; whence, with several more recent importations into that county, the birds have spread, thriven, and become very numerous in suitable localities throughout Norfolk, Suffolk, Essex, and the adjoining counties. The Red-leg is of a running and roaming disposition, and may often be searched for in vain in a locality in which numbers have been found a few days previously. The nesting-habits of this species resemble to a great extent those of the Grey Partridge, but it commences to lay somewhat earlier, and does not seem to object to nesting in thick brushwood, which is not a common practice with the latter bird. The eggs average from twelve to sixteen, and are of a creamy yellow, with rust-coloured spots and freckles. To those who shoot over pointers the Red-leg is a very objectionable bird, as his first impulse on being alarmed is to run off at full speed, with occasional halts for observation, and if really hard pressed to top the fences generally at a corner of the field, and alighting immediately to set off to cross the next field diagonally on foot. It has been, in our experience, quite an exceptional event to get a fair shot at a bird of this species on its rising before us, even from the thickest covert, and it is only by the driving system that a fair proportion of Red-legs are to be brought to bag; they are at all times cunning, and very apt to run for a corner if they have heard shots fired to their proper front; but when once they have decided on their line of flight no amount of shooting will turn them when on the wing, and where one or two have "come over" the great majority in the drive will continue to come. We have often, when standing behind a low fence for a drive, seen the Frenchmen making good running straight for us till nearly within shot, when they would pause, squat, and on hearing shots or seeing the head of a gunner above the fence creep off in a crouching manner to right and left. If they are observed to run with their beaks open their "wind" is exhausted, and they will not rise, but run for the nearest covert, and often in such cases take refuge in a covered drain or a rabbit-burrow.

The flight of the Red-leg is very much faster than it appears to be, and this bird sometimes comes along on wing with an indescribable look of being wounded, which is somewhat puzzling, as no doubt it is intended to be. We, on one occasion, marked down a Red-leg, which had not been shot at, into some thick sedge on the bank of our river near Lilford, and on taking a dog to the spot the bird jumped into the water, swam easily for a few yards, scrambled out again on a bare place, and took wing as if nothing unusual had happened; and on another occasion in the "Broad" district of Norfolk, we saw two of this species swimming with apparent ease and equanimity on a brimful marsh-ditch. The Red-legged Partridge frequently perches on bushes and trees, especially in wet weather, and may often be seen on stone walls. As a rule these birds thrive best upon light sandy soils; but with us in Northamptonshire they seem to vary their haunts without regard to the character of the ground or the crops growing thereon, only seeming to prefer an old weedy fallow field to any other locality. The flesh of the Red-leg is white and much dryer than that of the Grey Partridge, but in our opinion is by no means to be despised. A belief existed in the eastern counties that the "Frenchman" interferes with and drives away the indigenous species, and on this account, in many places, attempts were made to exterminate the foreigners by destroying their eggs and killing the birds at all seasons; but our experience goes to prove that this is a mistake, and in the only actual encounter ever witnessed by us between old males of the two species, the Grey bird had decidedly the best of it. The present species belongs to a division of the Partridge family to which naturalists have given the appellation of *Caccabis*, of which division three other species are found in Europe; these differ but slightly in coloration, habits, or cry, which is a sort of chuckling crow of five or six notes frequently repeated and very sonorous. The present species is *the* Partridge of Spain, in which country it still abounds in spite of the incessant warfare waged against it by man and numberless four-footed and feathered enemies at all seasons. Many Spaniards of high and low degree are excellent shots and most indefatigable walkers; but the prevailing method of Partridge-shooting is by means of a caged bird, who calls up, or ought to call up, the wild birds of his species to their destruction by the gun of Don Fulano, who sits or lies well hidden hard by. These call-birds are kept in small cages, in which they can barely turn round, and in spite of this close imprisonment and the idea, which seems to be well founded, that they die if water is given to them, these captives live in their cages for many years, and a good caller is only to be bought at a very high price, and sometimes hired for the day at a rate that usually far exceeds the value of the birds lured by him to their death. Throughout Morocco, Algeria, Tunis, and, we believe Tripoli, the genus *Caccabis* is represented by the Barbary Partridge, *C. petrosa*, a species

which is only met with in Europe in the island of Sardinia and on the Rock of Gibraltar, to which latter locality it has been imported from the opposite coast of Africa. This bird has been admitted by some authors into the British list on the strength of a few occurrences in various parts of England, of which particulars will be found at pp. 121, 122 of the fourth edition of 'Yarrell's British Birds,' with the reasons for its present exclusion from the said list. Another species of this division, *C. saxatilis*, known as the Greek Partridge, is found in many of the mountainous districts of France, Switzerland, Austria, Italy, European Turkey, the Ionian Islands, and Sicily, in which island it is the only indigenous Partridge, whilst in the Ægean archipelago, Cyprus, and Asia Minor a fourth species, *C. chukar*, is the representative bird. We consider Spain as the headquarters of the present species, *C. rufa*; it is also found in most parts of France, and locally throughout Northern and Central Italy and the Italian Islands, with the exceptions of Sardinia and Sicily, as above stated. We have pursued and shot all four of these species, of which we consider the so-called Greek Partridge the best, and the Barbary infinitely the worst, for the table. Shooting Red-legged Partridges is, from their habit of running before dogs and the generally very rough nature of their haunts, at all times a somewhat laborious business; but large bags may be made of the Barbary Partridge in North Africa, in many parts of which country it is extremely abundant. The best sport we have ever met with at the common Red-legged bird was on the heathy moors of the island of Minorca, which are divided by rough stone walls, through which the Partridge of course cannot run; the covert is also very close and thick and not too high, so that the birds got up at fair distances, and with a few Quails and Rock-Doves gave us very pretty shooting. This bird makes a peculiar whirring or ringing sound with the wings on rising to fly, and in Norfolk one learns soon which species to expect before seeing the birds. All the Red-legged Partridges are attracted by unusual sights, and we found that in Tunis the herd-boys kill a good number by putting on a brilliant piece of coloured cloth, or a skin of jackall or fox, over their heads and crawling towards the coveys in a zigzag fashion, often when within range knocking down several with one throw of the heavy knobbed sticks which they almost always carry. Our Red-leg is easily kept in captivity, and becomes very tame, but not to the same extent as its congener, the Greek Partridge above mentioned. We have at several times kept one or more of this last species, which ran about the house, would follow us for long distances, and always come to our call. On the whole we consider that *Caccabis rufa* is a valuable and handsome acquisition to our British game birds, and it is, with the exception of the various species of the Pheasant family, the only artificially introduced bird of any exotic species which has become thoroughly acclimatized and thrives at large in

our country. Our climate and soil would not suit the Greek Partridge, and the Barbary bird we can dispense with, but we are convinced that there are many species valuable from a sporting and a gastronomic point of view which might with care and attention become common in our islands; we would specially recommend the genera *Tetrao* and *Francolinus* to the attention of acclimatizers.

118. COMMON QUAIL. *Coturnix vulgaris*.

This species, which appears, from the accounts of old sportsmen and partly from our own recollection, not to have been uncommon in our county in the first half of the present century, has become decidedly scarce with us now, though few seasons pass in which we do not hear of its occurrence. Morton writes of the Quail as follows:—"Of the Quail, a Bird of Passage—I have only to note, that it comes into the sandy and warmer soil, (*s. gr.*) on the Northampton side, and near Rowel, and is to be met with there, at least a Fortnight before it settles in the colder Clayey Part of the County." From the above passage it is evident that the author quoted regarded the Quail as a regular visitor to the county; and we well recollect an old game-keeper, who had lived in the service of my grandfather, my father, and myself for some sixty years, and died some twenty years ago, having nearly attained his hundredth year, assuring us that in his youth several broods or beves of Quails were to be annually met with on various farms belonging to us. In our own shooting experience in the county, we never had the good fortune to meet with a bevy, but now and then used to find one or two of these birds on the manors of Pilton, Wadenhoe, Aldwinckle, and Titchmarsh in September, and on several occasions met with what our people would call "a hodd un" in the depth of winter; one of these latter cases occurred in rather a curious manner, as follows:—In the severe frost and snow of January 1855, we were searching for Snipes along a partially open brook, with a strong and high double thorn-fence on the far side from us; a Snipe rose at a short distance and fell dead to our shot into the middle of the said fence. We sent our old retriever to fetch the bird, and after some difficulty in working her way into the fence, we heard her make a rush and cried "Ware Rabbit"! but in a few seconds she came struggling back to us through the thorns with a Quail alive and uninjured in her mouth, and then went in a second time and brought out the Snipe to us quite dead. In July, 1870, two Quails' nests were mown out in our meadows near Thorpe, and the eggs brought to us; and Mr. F. Bruce Simson of Broom Hill, Spratton, has very kindly informed me that in the summer of 1880 he frequently heard the unmistakable call of this species near his house, and shot several in the neighbourhood in the following September. The latest occurrence of the Quail in the neighbourhood of Lilford which has come to our knowledge was on Sep-

tember 1st, 1882, when one was shot in a field of standing beans near Lowick. The Quail loves cultivation, but prefers the ancient style of that art, and does not approve of enclosurers; this we take to be the reason of the scarcity of the species in many parts of our islands in which it was formerly abundant; but it is still to be found pretty certainly in summer and early autumn in many parts of the fen countries, and till very recently was abundant on a property of ours in South-west Lancashire in districts drained and reclaimed from the bog, or "moss," as it is locally termed, within the memory of living men. In this locality a few Quails always remained throughout the winter, as we have reason to believe is generally the case in those parts of Europe in which the bird breeds, although the great bulk of the species migrate southwards on the approach of winter; this being their habit, it is somewhat difficult to give dates of arrival and departure with any approach to accuracy, particularly in the instance of the Quail, which, in this country at least, is pretty certain to be heard in the spring before it is seen; but we should consider that the principal arrival of Quails takes place in England in the third and fourth weeks of April, and that the majority are gone by the beginning of November. The cry or love-call of the male Quail consists of three shrill notes, which may be rendered as "whut we whee," with a strong sibilant accent on the second syllable: "wet my lips" is a common rendering of the sound into words, and perhaps as near the original as our language permits. The Quail, in common with many terrestrial birds, is a powerful ventriloquist, and we have often heard a caged bird of this species calling within a few feet of us, and conveying the impression of a distance of many yards. The note of the female consists of two low short notes repeated three or four times in succession. The nest is a very simple affair, a mere scratching of the ground, with a few dry bents as lining, and in our experience is generally met with in grass, lucerne, or common clover. We never found more than ten eggs in a nest, but more are often laid. Of the date of hatching in this country we can say nothing; but in Greece, Turkey, and Spain have met with young Quails perfectly full-feathered and fit to shoot by the middle of August, when they are generally covered with fat, and most delicious as food. This species is the only representative of the genus *Coturnix* that is found in Europe, and its range extends from Scandinavia to the Cape of Good Hope, and from the Azores to Japan. We have met with the Quail in every part of Europe and North Africa that we have visited, but nowhere in such abundance as in the Ionian Islands during the vernal migration: their numbers, however, at this season vary greatly, and though in the latter end of April, 1857, Corfu and the neighbouring islands of Paxo, Antipaxo, and Fano were literally swarming with Quails for three or four days, at the corresponding season of the year 1858 it was difficult to bag more than ten or fifteen couples in the most favoured localities. This spring Quail-shooting on the western side of Corfu

is rather hard work, as the birds are principally found in the currant-vines on the very steep hill-sides; and we have shot many a Quail which fell from 100 to 150 feet, and had to be retrieved by scrambling down through the interlaced branches of the terraced vines aforesaid under a warm sun. In our opinion the birds at this season are hardly worth the trouble they cost in the locality just mentioned, but the lovely scenery of Corfu and the variety of birds to be met with on their vernal migration to some extent repay a sportsman of an ornithological turn of mind. On the mainland of Epirus in August and September fair Quail-shooting may often be had in the cultivated lands; and in the latter month the sport may be varied with a few Great and Common Snipes, an odd Duck or two, and the walking, though generally more or less "soft," is comparatively easy. In the cultivated plains around and below Seville vast numbers of Quails are bred, and some are to be found at all times of the year, though their numbers are much thinned in the pairing-season by a clever method of calling up the birds into a net. This bird is a great favorite in Spain, and in every village street Quails are to be found in cages, petted and made much of on account of their song. Incredible numbers of this species are netted during the vernal migration on many parts of the Mediterranean shores, especially in Egypt and the southern provinces of Italy. We remember seeing a steamer at Messina, in the month of May 1874, one of whose officers assured us that she had six thousand pairs of Quails alive on board, all destined for the London market. The unhappy birds are carried in low flat cages or boxes wired only in front, and it is surprising what a very small percentage of them die on the voyage, unless "a sea" happens to break over them; they thrive well on millet and soon become fat; but in our opinion this traffic should be prohibited, as the unfortunate birds are caught on their way to their breeding-quarters and some of them, at all events, would afford sport at a legitimate season when naturally fit for the table. Quails will thrive for many years in confinement if kept properly clean, and become very tame, but are always very pugnacious among themselves at the pairing-season. Several of this species have at various times come aboard of our yacht in the Mediterranean, and one, which was found on deck off the coast of Cyprus, in April, 1875, lived peacefully for some weeks with a Turtle-Dove which was caught in the same manner, but killed two or three of its own species; this individual lived in good health and condition for several years in a small cage. The flight of the Quail is straight and fast. They are very easy to shoot in the open, and seldom fly to any great distance, but are difficult to flush a second time, and run and squat in a manner which often baffles the best of pointers. The best dogs for Quail-shooting are, in our opinion, small close-questing spaniels. Large numbers of Quails are taken in the Danubian provinces with Sparrow-Hawks, which are caught and trained for this especial purpose, and restored to liberty after the passage of their "quarry."

THE FLORA OF NORTHAMPTONSHIRE.

(Continued).

BY G. C. DRUCE, F.L.S.

URTICACEÆ.

Urtica dioica, L. Stinging Nettle.

Top. Bot., 367. Syme, E. B., 1279, 8, 127.

Native. Waste places, hedges, thickets, woods. Abundant and generally distributed. P. July—August.

First record—Notcutt, 1845.

The nettle forms a special feature in the undergrowth of many of our coppices, its extreme abundance destroying many of the more interesting sylvan plants. The leaves are frequently employed in preparing 'nettle tea' and 'nettle beer.'

U. pilulifera, L. Roman Nettle. Colonist. Rare. A. Aug.

Nene b, Irchester (Rev. H. Slater).

Var. b, Dodartii.

Nene b, near Kettering (W. Lewin).

Usually found on the site of some Roman station. It is said to have been introduced into England by the Roman soldiers, who had heard of the severity of our climate and feared it could not be endured without some stimulant (external), so brought over with them nettle seed to sow about their encampments, in order to have always near a plant which they might use (flagellatory), to preserve the warmth of their bodies. Whether Camden had good authority for the above statement we do not know ; it is quite possible the plant may have been accidentally introduced by them, the seeds of this and other species of *Urtica* being freely carried by animals, etc.

U. Urens, L. Small Stinging Nettle.

Top. Bot., 367. S. E. B., 1282, 8, 131.

Colonist or native. Way sides, waste places, generally in the vicinity of villages. A. June—September. Generally distributed, but much less common than *dioica*.

Perhaps more powerful as a Stinging Nettle than *dioica*. The foliage is not unfrequently variegated with yellow.

Parietaria diffusa, Koch. Wall Pellitory.

Top. Bot., 367. S. E. B., 1278, 8, 126.

Native. Walls, churchyards, etc. Rather common. P. June—September.

First Record—Wm. Pitt, 1797.

Cherwell, Chacombe, Byfield, Canon's Ashby ; Avon, Wiuwick ; Ouse, Grafton Regis ; Nene a, Brixworth, Duston, Kingsthorpe, Upton road, Dodford ; Nene b, Weston Favell, Higham Ferrers, Overstone, Woodford, Geddington, Rothwell ; Nene c, Bridge north of Oundle (Wm. Pitt, 1797), Peterborough (Paley), Barnwell Castle, Wansford ; Welland, Stamford, walls at Easton (Wm. Pitt), Barnack, Helpstone.

It was formerly much cultivated for medicinal purposes, and its situations about villages is in many cases owing to its former repute. The variety *erecta* was gathered at Brixworth.

Humulus Lupulus, L. The Hop.

Top. Bot., 367. S. E. B., 1284, 8, 133.

Denizen—hedges. Not very common. P. July—August.

First record—Wm. Notcutt, 1845.

Cherwell, Aynhoe (A. W.), Kingsutton ; Avon, Yelvertoft ; Ouse, Yardley Gobion, Roade ; Nene a, Harleston, Danes' Camp, Wootton, Roade, Preston Deanery ; Nene b, Great Billing, Raunds, Ringstead, Higham Ferrers, Warkton, Weekley ; Nene c, Peterborough (Paley), Wittering ; Welland, Collyweston.

* *Cannabis sativa*, L. Hemp. Casual ; waste ground. A. July—August.

Nene a, Dallington ; Nene b, Sewage Works, Vigo.

ULMACEÆ.

U. suberosa, Ehrh. Common Elm.

U. campestris (L.), Sm. Top. Bot., 368. S. E. B., 1285, 8, 137.

Denizen—hedges, parks, etc. Common. Tree. March—April.

First record—Morton, 1712.

Occurs in all the districts.

Morton refers to the large elms growing in the village of Blatherwyck, 22 feet in girth. The elms at Badby, Eydon, Hulcote, some of which appear to be considerably thicker than the elms at Blatherwyck.

“ Enormous elm tree boles did stoop and lean
Upon the dusky brushwood underneath ;
Their broad curved branches fledged with clearest green,
New from its silken sheath.”—TENNYSON.

A photograph of the Wolsey Elm has been given in this Journal.

Var. stricta, Lindl. About Fineshade.

U. montana, With. Wych Elm.

Top. Bot., 368. S. E. B., 1287, 8, 141.

Native. Hedges, woods. Tree. March—April.

First record—Wm. Notcutt, 1845.

The var. *glabra*, *major*, and *carpinifolia*, at Bugbrooke—Mr. Anderson.

This occurs in Northants in apparently less natural situations than the preceding species. In parks and ornamental grounds are many fine trees.

“Witch Elms that counterchange the floor
Of this flat lawn with dusk and bright.”—TENNYSON.

CUPULIFERÆ.

Quercus Robur, L. The Oak. Native. Woods, coppices, hedges. Common, and forming the great portion of the woods in the county. Tree. April—May.

First record—

Morton alludes to an oak growing into an ash in Sholebrook walk ; and also, between Corby and Rockingham, he instances as large trees, the Broad Oak in Rockingham Forest, spreading from bough end to bough end 38 yards, and 18 feet in girth. That called the Westmoreland Oak, nigh Apethorpe, is somewhat more in girth. And in one of Upton grounds was a stately oak six feet in diameter, trunk 31 feet long. One cut down in Moulton Park was 30 feet in girth. King Stephen's Oak, one of the boundaries of Rockingham Forest ; from this very tree King Stephen once shot a deer. So capacious is this that at the Brigstock process, when it is the custom to fill the hollow trunk with a company of boys, they generally put in 30 or 40 of them, for so many will it hold without difficulty.

Of the celebrated Oaks of Northamptonshire, photographs and descriptions of the following have already appeared in this Journal :—Gog, Magog, The Queen's Oak, The Salcey Oak, The Lowick and Morehay Oaks, and Judith, or Cowper's Oak.

Wake's Oak, at Wakefield, was destroyed about 12 years since, by some mischievous school boys.

Bloomfield visited Wakefield, and when there addressed some lines on Whittlebury Forest to his children—

“Genius of the forest shades,
Lend thy powers, and lend thine ears ;
A stranger trod thy lonely glades,
Amidst thy dark and bounding deer.
Inquiring childhood claims the verse,
Oh, let them not enquire in vain ;
Be with me while I thus rehearse
The glories of thy sylvan reign.
Thy dells by country currents worn,
Secluded haunts how dear to me !
From all but nature's converse borne,
No ear to hear, no eye to see.

Their honoured leaves the green oaks reared
And crown'd the upland's graceful swell.

* * * *

Hail greenwood shades, that, stretching far,
Defy e'en summer's noontide power.

* * * *

Now at the dark wood's stately side
Well pleased I met the sun again ;
Here fleeting fancy travelled wide,
My seat was destined to the main.
For many an oak lay stretched at length,
Whose trunk (with bark no longer sheathed)
Had reached their full meridian strength
Before your father's father breathed.

The *var. sessiliflora*, Sal., has been noticed at Warkworth.

Carpinus Betulus, L. Hornbeam. Native. Woods, coppices. Rare in a native state. Tree. May.

First record—Gerarde, Emac. 1633, "Common in Northamptonshire."

Nene a, Dallington, Upton, etc., planted ; Nene b, Yardley Chase, native ; some good sized trees and much undergrowth.

Corylus avellana, L. Hazel.

Top. Bot., 372. S. E. B., 1294, 8, 178.

Native. Hedges, coppices, woods, etc. Common and generally distributed, especially abundant in Whittlebury Forest, whence great quantities of nuts are brought into the Northampton market. Tree. March—April.

First record—Notcutt, 1845.

* *Castanea vulgaris*, L. Sweet Chestnut.

C. sativa, Mill. S. E. B., 1290, 8, 159. Alien, plantations. Tree. Rare. May.

First record—Morton, 1712.

Ouse, Whittlebury Forest ; Nene a, spontaneously in the wood called Stamps nigh Farthingstone (Morton), the Castle Dykes, Fawsley, Daventry, Harlestone Firs, Lamport ; Nene b, Geddington ; Nene c, Milton.

Fagus sylvatica, L. The Beech.

Top. Bot., 370. S. E. B., 1291, 8, 164.

Denizen—woods, parks, etc. Tree. March—April.

First record—Morton, 1712. "The huge beech tree in Fawsley Park under which the hundred court called Mungrave was formerly kept."

It occurs as a planted tree in all the districts.

A photograph and description of the beech tree at Billing has already appeared in this Journal.

NORTHAMPTONSHIRE MOSSES.

By H. N. DIXON, M.A., F.L.S.

THE following is a supplementary list to the preliminary list of Northamptonshire Mosses published in the Journal of August, 1884. It consists of (1) mosses newly recorded during the past year ; (2) new localities for some of the rarer species. I have also included some records kindly sent me by Mr. R. Rogers, chiefly for the district about Castle Ashby.

NEW SPECIES RECORDED :

25. *Systegium crispum*, Hedw. Kingsthorpe.
117. *Pottia intermedia*, Turn. Kingsthorpe ; Castle Ashby (R. Rogers).
126. *P. lanceolata*, Dicks. Newnham ; Kingsthorpe.
132. *Didymodon sinuosus*, Wils. Rush Mills, Northampton ; on stones (b).
137. *Ditrichum flexicaule*, Schwg. Wittering (b).
141. *Trichostomum tophaceum*, Brid. Quarry, Wansford.
150. *Barbula aloides*, Koch. Kingsthorpe ; Castle Ashby (R. Rogers) ; Moulton.
151. *B. lamellata*, Lindb. Mud cap of walls, Kingsthorpe.
157. *B. muralis* var. *b. aestiva*, Brid. Wall of Althorp Park.
159. *B. fallax* var. *b. brevifolia*, Wils. Duston (b).
163. *B. spadicea*, Mitt. Newnham (b) ; Rush Mills, Northampton (b).
166. *B. Hornschuchiana*, Schultz. Newnham (b).
- Ceratodon conicus*, Lindb. Mud cap of walls, Duston and Kingsthorpe ; the latter in fine fruit, 1885.
241. *Ulota crispa*, Hedw. Salcey Forest, on oaks ; Ashton, on poplar.
252. *Orthotrichum obtusifolium*, Schrad. On an ash near Kettering, April 3, 1885 (b).
258. *O. pumilum*, Swartz. Same tree as the last, Kettering.
264. *O. leiocarpum*, B. & S. Salcey Forest ; Harleston Firs ; Ashton.
330. *Bryum bimum*, Schreb. Frequent in bogs and on banks of streams ; Wittering ; Ashton ; Northampton, etc.
335. *B. murale*, Wils. Harleston Heath, on a brick wall.
353. *B. roseum*, Schreb. Northampton (b).
378. *Atrichum undulatum* var. *abbreviatum*, Bry. Brit. Broughton.
- Catharinaea* (= *Atrichum*) *Dixonii*, Braith. Ms. Northampton, April 3, 1884 (b) (v. Journal, May, 1885 ; and Journal of Botany, June, 1885).
388. *Polytrichum formosum*, Hedw. Bedford Purlieus.
392. *P. commune* var. *b. perigoniale*, Schpr. Kingsthorpe Quarries.
423. *Neckera pumila*, Hedw. On a birch, Salcey Forest (b).

- 446. *Thuidium abietinum*, L. Wittering (b).
- 458. *Camptothecium lutescens*, Huds. Wittering ; King's Cliffe ; Nassington ; all barren.
- 460. *Scleropodium caespitosum*, Wils. Kingsthorpe (b).
- 488. *Eurhynchium Teesdalii*, Sm. Kingsthorpe, on stones by water.
- 509. *Amblystegium serpens* var. *b. majus*, Brid. Damp meadows near Castlethorpe.
- 520. *Hypnum revolvens*, Swartz. Wittering Marsh (b).
- 524. *H. commutatum*, Hedw. Abundant in bogs, Wittering (b).
- 540. *H. palustre*, L. Kingsthorpe (b).

NEW LOCALITIES FOR SOME OF THE RARER SPECIES :

- 82. *Campylopus flexuosus*, Brid. Wittering (b) ; Bedford Purlieus, in fruit.
- 160. *Barbula recurvifolia*, Schpr. Floore House, in very fine and abundant fruit. Duston Pits, probably the original locality for the previous habitat, sparingly in fruit.
- 168. *B. convoluta*, Hedw. Fruiting, Newnham.
- 178. *B. latifolia*, B. & S. In fruit on several trees in the Nene valley ; Harleston ; Kingsthorpe ; Castlethorpe.
- 233. *Zygodon viridissimus*, Dicks. Fruit at Daventry ; Sywell ; and again at Houghton, 1885.
- 259. *Orthotrichum tenellum*, Bruch. Wittering ; Grafton Regis ; Nassington, etc.
- 263. *O. Lyellii*, H. & T. Fruit at Castle Ashby (R. Rogers) ; at Nobottle and Salcey Forest.
- 358. *Mnium affine*, Bland. Castlethorpe (b).
- 359. *M. undulatum*. Hedw. Fruit, Nobottle.
- 382. *Pogonatum nanum*, Neck. Kingsthorpe.
- 408. *Fissidens adiantoides*, Hedw. Wittering (b).
- 480. *Eurhynchium striatum*, Schreb. Fruit, Salcey Forest.
- 482. *E. piliferum*, Schreb. Nobottle ; Grafton Regis ; barren.
- 511. *Amblystegium irriguum*, Wils. Fruit at Wittering.

TULIPA SYLVESTRIS IN NORTHAMPTONSHIRE.

SIR HEREWALD WAKE has kindly given me a specimen of the Wild Tulip (*Tulipa sylvestris*) in flower, from Courteenhall, and has asked me to send a note on the subject to the Journal. This is the first record of the plant being found wild in the county, and as it has hitherto been found truly wild in only about half-a-dozen English counties, it is a valuable addition to our local flora. Sir Herewald Wake has observed the plant for several years back, but this is the first time that it has come into flower.

H. N. DIXON.

SUPPLEMENTARY AUTHENTICATED LIST OF THE MOLLUSCA OF NORTHAMPTONSHIRE.

By W. DENISON ROEBUCK, F.L.S., AND JOHN W. TAYLOR.

THE following list is a further transcript from the record-books of the Conchological Society, and—as in the first case—it includes only such records as have been seen by the Society's referee (Mr. John W. Taylor).

The materials upon which this further instalment is based are :—

(1). A series of more detailed memoranda of the collections made at and near Peterborough, in the year 1882, by Mr. Thos. W. Bell, M.C.S., of Leeds, which have turned up since the publication of the former list.

(2). A further series of shells from the Rev. H. H. Slater, M.A., F.Z.S., etc., of Irchester, near Wellingborough, collected in 1884 and 1885, at that place, and also near Peterborough.

(3). A further extensive series of collections made in the immediate vicinity of the town of Northampton, by Mr. W. D. Crick, of that place, in the years 1884 and 1885.

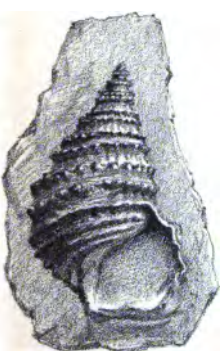
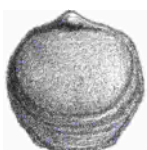
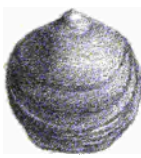
(4). A series of shells collected by Mr. A. Loydell, of London, in the neighbourhood of Towcester and in other localities in the extreme S.E. corner of the county, during the past year or two.

It is again observable that as yet the western side of the county still remains untouched and uninvestigated, as the collections made by Messrs. Bell, Crick, and Slater are made within the area of their previous work, and that the fresh area covered by the investigations of Mr. Loydell amount to a continuation of that worked by Mr. Crick, which is thereby extended to the southern border of the county.

The present paper contains records concerning 28 species and 7 varieties of fluviatile and 25 species and 5 varieties of land mollusca. Of these, 6 species and 6 varieties of water shells, and 2 species and 2 varieties of land shells are additional to the recorded county-fauna, which is now constituted as follows :—

Water Shells	...	..	34	species and 12 varieties.
Slugs	...	...	4	„ 2 „
Land Shells	...	...	39	„ 19 „
Total	...		77	33

No slugs have been submitted since the publication of the previous list.



Five of the species which we indicated in the former paper as the most likely to be added have been submitted, and the chief work that remains to be done is to search for the four slugs which were indicated at the same time and in the same manner as being likely to reward investigation. Of these the Yellow or Cellar-slug (*Limax flavus*) is almost certain to inhabit the cellars of houses in the large towns, while for the Marsh Slug (*Limax lavis*), it would be well to look close to the water-line on the banks of canals and ditches, and in wet and marshy places generally; no doubt *Zonites nitidus*, its usual associate, would be found in company with it. The Tree-slug (*Lehmannia arborum*) should be looked for in rainy weather in the immediate vicinity of beech-woods, or crawling on buildings; while for the Keeled Slug (*Analia marginata*), it will doubtless, being an unclean feeder, turn up in refuse-heaps sooner or later.

The initials appended to the records are those of T. W. Bell, W. D. Crick, A. Loydell, and H. H. Slater. The species and varieties marked * are additional to the recorded fauna.

LIST.

Sphærium corneum (L.)—Mason's drain near Peterborough, T.W.B.; Borough Fen near Peterborough, a few, H.H.S.; Canal, Far Cotton, Feb. 21, 1885, W.D.C.; River Nene, Northampton, between Old Sewage Works and Paper Mills, and back brook near the latter place, Feb. 14, 1885, abundant on the mud of the river banks and on weeds, W.D.C.; Litchborough, Aug. 22, 1884, A.L.; Irchester, bleached examples, H.H.S.

Sphærium corneum v. * *Scaldiana* (Norm.)—Canal, Northampton, Nov. 1, 1883, A.L. The specimens are not quite characteristic of the variety.

Sphærium rivicola (Leach).—Canal, Far Cotton, Northampton, twelve, Feb. 21, 1885; already recorded, but the locality now extends from where the main line of the L. & N. W. Railway crosses the canal to opposite Hunsbury Hill furnaces, W.D.C.

Sphærium lacustre (Müll.)—Borough Fen near Peterborough, one, H.H.S.

**Pisidium fontinale* v. *pulchella* Jen.—River Nene, Northampton, between Old Sewage Works and Paper Mills, and back brook near the latter place, Feb. 14, 1885, one valve, W.D.C.

Unio tumidus v. *radiata* Colb.—Canal at Far Cotton, Northampton, one, Feb. 21, 1885, W.D.C.

Unio pictorum (L.)—Canal at Far Cotton, Northampton, two, Feb. 21, 1885, W.D.C.; Canal near Blisworth, A.L.; Byfield pool, April 6, 1885, W.D.C.

Anodonta cygnea (L.)—Irchester Beck, three, H.H.S. ; Byfield Pool, April 6, 1885, enormous quantities scattered all around the pool ; near the water they are thickly strewn, and many specimens are to be found several hundred yards away, W.D.C. ; who cannot surmise how they came there.

Dreissena polymorpha (Pall.)—Irchester, bleached specimens, H.H.S.

Paludina contecta (Mill.)—Mason's Drain near Peterborough, T.W.B.

Paludina vivipara (L.)—River Nene, Northampton, between Old Sewage Works and Paper Mills, and back brook near the latter place, Feb. 14, 1885, one, dead, W.D.C.

Bythinia tentaculata (L.)—Irchester Beck, one, adult, H.H.S. ; Mason's Drain near Peterborough, T.W.B. ; Borough Fen near Peterborough, plentiful, H.H.S. ; Canal at Far Cotton, Northampton, two, Feb. 21, 1885, W.D.C. ; River Nene, Northampton, between Old Sewage Works and Paper Mills, and back brook near the latter place, Feb. 14, 1885, plentiful, W.D.C. ; Tove, Aug. 20, 1884, A.L. ; Irchester, bleached examples, H.H.S.

Bythinia leachii (Shepp.)—Mason's Drain near Peterborough, T.W.B.

Valvata piscinalis (Müll.)—Mason's Drain near Peterborough, T.W.B. ; Tove, Aug. 20, 1884, A.L. ; Irchester, dead examples, H.H.S.

**Valvata cristata*, Müll.—Borough Fen near Peterborough, a few, on caddis-cases, H.H.S.

Planorbis nautilus (L.)—Tove, on caddis-cases, Aug. 11, 1884, A.L.

Planorbis nautilus v. **crista* (L.)—Tove, on caddis-cases, with type, Aug. 11, 1884, A.L.

Planorbis albus Müll. — River Nene, Northampton, between Old Sewage Works and Paper Mills, on caddis-cases, Feb. 14, 1885, W.D.C. ; Tove, on caddis-cases, Aug. 11, 1884, A.L. ; back brook, Blakesley Hall, A.L.

Planorbis spirorbis Müll.—Woodend, Aug., 1882, A.L.

Planorbis vortex (L.)—Eye, and Mason's Drain near Peterborough, T.W.B. ; Borough Fen near Peterborough, young specimens, on caddis-cases, H.H.S. ; River Nene, Northampton, between Old Sewage Works and Paper Mills, Feb. 14, 1885, two, W.D.C. ; Clay-pit near Walton Station, April 14, 1885, one dead specimen, W.D.C.

Planorbis carinatus Müll.—Irchester, one, H.H.S. ; Borough Fen, Peterborough, one, H.H.S. ; River Nene, Northampton, between Old Sewage Works and Paper Mills, Feb. 14, 1885, four, immature, W.D.C. ; Tove, on caddis-case, A.L. ; Tributary of Tove, A.L. ; Irchester, bleached examples, H.H.S.

Planorbis carinatus v. **disciformis* Jeff.—Clay-pit near Walton Station, April 14, 1885, W.D.C.

- Planorbis complanatus* (L.)—Mason's Drain near Peterborough, T.W.B. ; Borough Fen near Peterborough, one, H.H.S. ; Irchester, bleached examples, H.H.S.
- Planorbis corneus* (L.)—Borough Fen near Peterborough, a few, young, H.H.S. ; River Nene, Northampton, between Old Sewage Works and Paper Mills, Feb. 14, 1885, one, dead, W.D.C. ; Tributary of Tove, A.L. ; Irchester, bleached examples, H.H.S.
- Planorbis contortus* (L.)—Mason's Drain near Peterborough, T.W.B. ; Tove, A.L.
- Physa fontinalis* (L.)—Borough Fen near Peterborough, one, H.H.S. ; River Nene, Northampton, between Old Sewage Works and Paper Mills, Feb. 14, 1885, plentiful, W.D.C. ; Tributary of Tove, A.L.
- Physa fontinalis* v. * *inflata* Moq.—Tributary of Tove, with type, one, A.L.
- Limnæa peregra* (Müll.)—Borough Fen near Peterborough, young, numerous, H.H.S. ; Clay-pit near Welton Station, April 14, 1885, W.D.C. ; Mill-pond, Grimscothe, A.L.
- Limnæa peregra* v. *ovata* Drap.—Small pond opposite Queen's Cross, Northampton, W.D.C. ; between Old Sewage Works and Paper Mills, Feb. 14, 1885, abundant, W.D.C. ; Clay-pit near Welton Station, April 14, 1885, W.D.C. ; Irchester, bleached examples, H.H.S.
- Limnæa auricularia* (L.)—Mason's Drain near Peterborough, T.W.B. ; River Nene, Northampton, between Old Sewage Works and Paper Mills, and back brook near the latter place, Feb. 14, 1885, one, W.D.C. ; Irchester, dead specimens, H.H.S.
- Limnæa stagnalis* (L.)—River Nene, Northampton, between Old Sewage Works and Paper Mills, and back brook near the latter place, one, young, Feb. 14, 1885, W.D.C. ; Tributary of Tove, A.L.
- Limnæa stagnalis* v. * *fragilis* (L.)—Irchester, dead specimens, H.H.S.
- Limnæa palustris* (Müll.)—Mason's Drain near Peterborough, T.W.B. ; Borough Fen near Peterborough, one, H.H.S. ; River Nene, at Northampton, between Old Sewage Works and Paper Mills, and back brook near the latter place, Feb. 14, 1885, one, W.D.C.
- **Ancylus lacustris* (L.)—River Nene between Old Sewage Works and Paper Mills, several on stones in gravelly part of river-bed, Feb. 14, 1885, W.D.C.
- Ancylus lacustris* v. * *albida* Jeff.—Small pond opposite Queen's Cross, Northampton, W.D.C.
- Limax maximus* v. *obscura* Moq.—The slug which was recorded in the previous paper was cited by a manuscript name (*subunicolor* Roeb.) It has since been settled that it is referable to Moquin's var. *obscura*.

The doubt before having been whether this variety was one of *L. maximus* or of *L. cinereo-niger*, the name *subunicolor* was used tentatively. It has never been characterized or described, and it was by an oversight that it was made use of in the Authenticated List of Northamptonshire Mollusca.

Succinea elegans Risso.—Irchester, a few dead examples, H.H.S.

Vitrina pellucida Müll.—Northampton, W.D.C. ; Kettering Road, opposite Campion's Lodge, Northampton, December, 1884, under stones in hedgerows, W.D.C. ; London and North-Western Railway bank opposite Watford, April 14, 1885, two, W.D.C.

Zonites nitidulus (Drap.)—Irchester, one, H.H.S.

* *Zonites glaber* (Stud.)—Irchester, two, small, H.H.S. ; near Blakesley, A.L.

Zonites purus v. *margaritacea* Jeff.—Northampton, W.D.C.

Zonites radiatulus (Ald.)—Clay-pit near Welton Station, April 14, 1885, W.D.C.

Zonites crystallinus (Müll.)—Northampton, W.D.C. ; Stone-quarry at New Duston, Feb., 1885, two, under stones, W.D.C.

Zonites fulvus (Müll.)—Spinney opposite the Queen's Cross, Northampton, seven, W.D.C. ; Stone-quarry at New Duston, Feb., 1885, two, under stones, W.D.C.

Helix aspersa Müll.—East and West Junction Railway, opposite Byfield Pool, April 6, 1885, one, W.D.C. ; Kettering Road, opposite Campion's Lodge, Northampton, Dec. 1884, abundant, under stones in hedgerows, W.D.C.

Helix aspersa v. * *conoidea* Pic. (distorted).—Grimscoate, A.L.

Helix nemoralis v. *carnea* 12345.—Grimscoate, A.L.

Helix nemoralis v. *carnea* 123(45).—Peterborough, T.W.B.

Helix nemoralis v. *rubella* 00000.—East and West Junction Railway, opposite Byfield Pool, April 6, 1885, one, W.D.C.

Helix nemoralis v. *rubella* 02345.—East and West Junction Railway, opposite Byfield Pool, April 6, 1885, one, W.D.C.

Helix nemoralis v. *castanea* 00000.—Irchester, one, adult, very dark colour, H.H.S.

Helix nemoralis v. *libellula* 00000.—Borough Fen, Peterborough, June, 1884, H.H.S.

Helix nemoralis v. *libellula* 00300.—East and West Junction Railway, opposite Byfield Pool, April 6, 1885, W.D.C. ; Grimscoate and Little Island, A.L.

Helix nemoralis v. *libellula* 00345.—Eye near Peterborough, T.W.B.

Helix nemoralis v. *libellula* (12345).—Eye and Newark, near Peterborough, one each, T.W.B. ; East and West Junction Railway, opposite Byfield Pool, one, April 6, 1885, W.D.C.

- Helix nemoralis* v. *libellula* 023(45).—Eye, T.W.B. ; East and West Junction Railway, opposite Byfield Pool, April 6, 1885, one, W.D.C.
- Helix nemoralis* v. *libellula* (12)345.—Eye, T.W.B.
- Helix nemoralis* v. *libellula* (123)45.—Eye, T.W.B.
- Helix nemoralis* v. *libellula* 1(23)45.—Eye, T.W.B.
- Helix nemoralis* v. *libellula* 12345.—Peterborough and Eye, T.W.B.
- Helix nemoralis* v. *libellula* (123)(45).—Eye near Peterborough, T.W.B.
- Helix hortensis* v. *lutea* 1(234)5.—Eye, T.W.B.
- Helix hortensis* v. *lutea* 12345 *arenicola*.—Peterborough and Eye, T.W.B. ; near Braddon, A.L.
- Helix hortensis* v. *lutea* 00000.—Dogsthorpe and Eye, T.W.B. ; Grimscote and Dalscote, A.L.
- Helix hortensis* v. *lutea* 12345.—Dogsthorpe, Eye, and Peterborough, T.W.B.
- Helix hortensis* v. *lutea* 123(45) *arenicola*.—Eye, T.W.B.
- Helix hortensis* v. *lutea* (12)345.—Peterborough, T.W.B.
- Helix hortensis* v. *lutea* 10345.—Newark and Eye, T.W.B.
- Helix hortensis* v. *lutea* (123)(45).—Dogsthorpe and Peterborough, T.W.B.
- Helix hortensis* v. *lutea* 12340 *arenicola*.—Peterborough, T.W.B.
- Helix hortensis* v. *lutea* 10345 *roseolabiata*.—Grimscote, A.L.
- Helix hortensis* v. *lutea* 1(23)45.—Eye, T.W.B.
- Helix hortensis* v. *lutea* (12345).—Eye and Peterborough, T.W.B.
- Helix hortensis* v. *lutea* 00340 *arenicola*.—Eye, T.W.B.
- Helix hortensis* v. *lutea* (123)45.—Eye, T.W.B. ; Grimscote, A.L.
- Helix cantiana* Mont.—Kettering Road, opposite Campion's Lodge, Northampton, Dec., 1884, in hedgerows, under stones, dead specimens only, W.D.C. ; Limestone-pit, Grimscote, A.L. ; Foster's Booth, Aug. 23, 1884, A.L.
- Helix rufescens* Penn.—Limestone-pit, Grimscote, A.L.
- Helix rufescens* v. *minor* Jeff.—Mason's Drain near Peterborough, T.W.B.
- Helix rufescens* v. *alba* Moq.—Woodend, Aug. 25th, 1884, A.L.
- Helix hispida* L.—Mason's Drain near Peterborough, T.W.B. ; Spinney opposite the Queen's Cross, Northampton, six, W.D.C. ; Stone quarry at New Duston, Feb. 1885, three, under stones, W.D.C. ; Kettering Road, opposite Campion's Lodge, Northampton, Dec., 1884, under stones in hedgerows, W.D.C. ; London and North-Western Railway bank opposite Watford, April 14, 1885, W.D.C. ; Clay-pit near Welton Station, April 14, 1885, W.D.C.
- Helix virgata* Da Costa.—Mason's Drain near Peterborough, T.W.B. ; Irchester, two, H.H.S. ; Kettering Road, Northampton, opposite

Campion's Lodge, Dec., 1884, hedgerow, under stones, dead specimen only, W.D.C. ; Slapton, Aug. 20, 1884, A.L. ; Foster's Booth, Aug. 23, 1884, A.L. ; signal post between Braddon and Towcester, dead shells, Aug. 23, 1884, A.L.

Helix caperata Mont.—Newborough near Peterborough, T.W.B.

Helix ericetorum Müll.—In sending another specimen, H.H.S. states that this species is a rare one at Irchester ; East and West Junction Railway, opposite Byfield Pool, April 6, 1885, W.D.C. ; Railway between Braddon and Towcester, all dead shells, A.L.

Helix ericetorum v. *minor* Moq.—Railway between Braddon and Towcester, with type, all dead, A.L.

Helix rotundata Müll.—Stone-quarry at New Duston, under stones, Feb., 1885, seven, W.D.C. ; Grimscoate and Woodend, Aug. 21, 1884, A.L.

Helix rupestris Drap.—Gayton, Aug., 1882, A.L.

**Helix pygmæa* Drap.—Gayton, Aug., 1882, A.L.

Helix pulchella Müll.—London and North-Western Railway bank opposite Watford, April 14, 1885, eight, W.D.C. ; several localities—not stated—in South-east Northamptonshire, A.L.

Helix pulchella v. *costata* Müll.—Moss-covered wall near Moulton Park, with the type (already recorded), very plentiful, W.D.C. ; Kettering Road, opposite Campion's Lodge, Northampton, under stones, in hedgerow, Dec., 1884, W.D.C. ; several localities—not stated—in South-east Northamptonshire, with type, A.L.

Bulimus obscurus (Müll.)—Grimscoate, A.L.

Pupa umbilicata Drap.—Gayton and Grimscoate, A.L.

Pupa marginata Drap.—Newborough near Peterborough, T.W.B.

Clausilia rugosa v. * *tumidula* Jeff.—Foxley, not characteristic, A.L.

Cochlicopa lubrica (Müll.)—Mason's Drain near Peterborough, T.W.B. ; Grimscoate, March 15, 1884, A.L.

Carychium minimum Müll.—Northampton, W.D.C.

The recorders of the Conchological Society cannot conclude without expressing their sense of gratification with the manner in which the conchological investigators of Northamptonshire have assisted in the matter of 'authenticated lists ;' they have submitted the whole of their collections, and so given that fair and just idea of the conchology of their district which can never be given by the submission of selected specimens, whatever be the principle which guides the selection. The result of the labours of Messrs. Crick, Rogers, Loydell, Bell, Madison, and Slater is that Northamptonshire, which till within the last decade was one of the *terre incognitæ* of conchology, bids fair to become one of the most systematically and most intelligently investigated counties of Britain.

MIDLAND UNION OF NATURAL HISTORY SOCIETIES.

EIGHTH ANNUAL MEETING, BIRMINGHAM, 1885.

The Eighth Annual Meeting of the Union was held at Birmingham on the 16th and 17th June. Unfortunately the attendance from other towns was but small, although the local Societies had made excellent arrangements for Meetings, Conversazione, and Excursions.

The Council Meeting, held in the Council Chamber of the Birmingham Corporation, by kind permission of the Mayor (Ald. T. Martineau), was attended by fifteen delegates. Reports were read from the Secretaries, Management Committee, and Treasurer. It was resolved that in order to open the way for the admission of such Scientific Societies as are not strictly Natural History Societies, the name of the Union be altered to "The Midland Union of Natural History and Scientific Societies."

After the Meeting of the Council, the President of the Union (R. W. Chase, Esq.) entertained the delegates and a number of other gentlemen at luncheon at the Grand Hotel.

The Annual General Meeting was held (by the kind permission of the Bailiff and Council) in the Examination Hall of the Mason College. In addition to the delegates, there were a number of members and friends present—among them the Rev. H. W. Crosskey, Messrs. W. H. France, Robt. Chase, Miss Taunton, Miss Jermyn, Mrs. Potts, Birmingham; Herbert G. Young, of London; H. Pearce, Stourbridge; E. George, Northampton; H. E. Forrest, Shrewsbury; Rev. W. H. Painter, and others.

The President of the Union, R. W. Chase, Esq., was in the chair, and read a very interesting Address on the work of Natural History Societies, and on some special points in the science of ornithology, of which he is a most assiduous and successful follower. The thanks of the meeting were heartily voted to him for the Address, and he was requested to allow it to be published in the "Midland Naturalist."

The Annual Report was then read and adopted, and ordered to be printed in the "Naturalist." Mr. A. W. Wills then moved, Mr. W. R. Hughes seconded, and it was resolved, that Messrs. A. W. Wills, E. W. Badger, and Professor W. Hillhouse be requested to take steps to circulate the appeal on the subject of the preservation of rare plants which is embodied in the Annual Report.

REPORT OF THE COUNCIL.

SOCIETIES IN THE UNION.

During the past year the composition of the Union has undergone but little change. The Shropshire Archæological and Natural History Society and the Oxfordshire Natural History Society have withdrawn from the Union, but the Council is gratified to announce that the Rugby School Natural History Society, which for a short time belonged to the Union and then seceded, has decided to re-enter it, so that the list of the component Societies will now stand as follows:—

Bedfordshire Natural History Society and Field Club.
 Birmingham Microscopists' and Naturalists' Union.
 Birmingham Natural History and Microscopical Society.
 Birmingham Philosophical Society.
 Birmingham and Midland Institute Scientific Society.
 Birmingham School Natural History Society.
 Caradoc Field Club.
 Dudley and Midland Geological and Scientific Society and Field Club.
 Evesham Field Naturalists' Club.
 Leicester Literary and Philosophical Society.
 Northamptonshire Natural History Society.
 Nottingham Naturalists' Society.
 Nottingham Working Men's Naturalists' Society.
 Oswestry and Welshpool Naturalists' Field Club.
 Peterborough Natural History and Scientific Society.
 Rugby School Natural History Society.
 Severn Valley Naturalists' Field Club.
 Tamworth Natural History, Geological, and Antiquarian Society.

WORK OF THE YEAR.

Of the Work of the Societies during the year there is little of general interest to report. Most of the Societies publish separate transactions, but we think there is an increasing disposition to use the "Midland Naturalist" for the purpose of publishing observations and suggestions.

The Leicester Literary and Philosophical Society, Section D. (Zoology and Botany), and the Nottingham Naturalists' Society are especially to be congratulated upon the praiseworthy attempt they are making to enable the "Midland Naturalist" to better fulfil one of the purposes for which it was established, namely, to be a means of making more widely known what is being done by the various Societies in the Union.

MIDLAND NATURALIST.

The numbers of this periodical which have appeared since the last report have, we consider, fully sustained or more properly enhanced its reputation, and the editors—Messrs. W. J. Harrison and E. W. Badger—deserve the thanks of all our members for their energy and activity in the office they hold. It is, however, obvious that a still larger number of Societies might, with advantage, contribute to its pages, the amount of matter on hand being still but seldom equal to the monthly demand.

The Council also take this opportunity of thanking those persons, especially the Committee of the Birmingham Natural History and Microscopical Society, to whose kindness they owe the illustrations with which the "Midland Naturalist" has been recently enriched.

The principal articles published in this Journal since the last report are as follows:—

The Preservation of Native Plants, by A. W. Wills; Botanical Notes in connection with the Peterborough Meeting, by Rev. M. J. Berkeley and G. C. Druce; Address of the President, Rev. J. J. S. Perowne, on the Repairs to Peterborough Cathedral; Study of a Lichen from Oban, by W. H. Wilkinson; *Lunularia vulgaris*, by Rev. H. P. Reader; On the Mammals of Leicestershire, by F. T. Mott; On the Zygnemaceæ: a Chapter in the History of Fresh Water Algae, by F. Bates; A Fungus Foray in the Middleton District, by J. E. Bagnall; Penmaenmawr, by T. H. Waller; Report on Marine

Sponges Dredged at Oban, by H. J. Carter; On the Structure of Mosses, by F. T. Mott; Breaking of the Meres, simulated by an excessive development of *Uroglena Volvox*, by Wm. Southall; *Floscularia mutabilis*, by Dr. C. T. Hudson; On the Best Methods of Studying Botany for Beginners, by F. T. Mott; On the Pre-carboniferous Floor of the Midlands, by W. J. Harrison; On the Development of a Fern from its Spore, by G. C. Turner; Koch's Comma Bacillus, by W. B. Grove; The Lias Marlstone of Leicestershire as a Source of Iron, by E. Wilson; On the Nervous System of Vegetables: Do Plants Feel? by F. T. Mott; The Life-history of a Filiform Alga, by Dr. M. C. Cooke; The Physiology of the Medicinal Leech, by Prof. J. B. Haycraft; Notes on Two Rare Annelids, by T. Bolton; The Ear and Hearing, by W. J. Abel; The Middle Lias of Northamptonshire, by B. Thompson; On the Intercellular Relations of Protoplasts, by Prof. W. Hillhouse; Notes on the Mymaridæ, by F. Enock; Roraima Mountain, by W. P. Marshall. The Flora of Warwickshire, by J. E. Bagnall; The Pilobolids, by W. B. Grove; and the Exposition of the Principles of Biology, by various members of the Sociological Section of the Birmingham Natural History Society, have also been continued. The Council are pleased to observe that while most of the old contributors maintain their ground, the names of several new and energetic workers are added to the list.

DARWIN MEDAL.

The subject for the Darwin Prize for this year, 1885, is Geology, and the Management Committee requested the services as adjudicators of the following gentlemen, who all courteously consented to examine and report upon the papers which were eligible for the competition, viz.:—Professor A. H. Green, of Leeds; Professor J. W. Judd, of London; Professor T. G. Bonney, of Oxford; Professor C. Lapworth, and Dr. H. W. Crosskey, of Birmingham.

Mr. C. J. Watson was requested to act as Secretary to the adjudicators. On his report to the Council of the opinions given by the adjudicators it was decided that a medal be awarded to our late Honorary Secretary, Mr. W. J. Harrison.

PRIZES FOR PHOTOGRAPHY.

The subject of offering prizes for Scientific Photography has been under the consideration of the Committee, but they report that they have decided that the state of the funds of the Union will not permit of such a step being taken at present. The Council, nevertheless, wish to direct the attention of the members to this important branch of scientific work. Although very frequently something more of the nature of a diagram is required for the illustration of a paper, yet they are sure that a good photograph would in many cases prove preferable to any engraving for the "Midland Naturalist."

Some of the Societies of the Union have already derived benefit from the much more popular form of photography available at the present day; and have had the opportunity of seeing photographs taken by members of the Societies during visits to America on the occasion of the meeting of the British Association in Montreal. The tourist who can bring back, impressed on his dry plates, pictures of the natural wonders of Niagara, or of the Yellowstone Park, from the points of view which have specially captivated his own eye, has laid up for himself and his friends a pleasure which published photographs rarely give, while the simplicity and ease of performance of the requisite processes permit him to photograph scenes which, without

any such interest as would attract a professional artist, yet by their personal associations, or from temporary causes, have become interesting to himself.

PRESERVATION OF NATIVE PLANTS.

The lamentable results of the unchecked eagerness for collecting rare or specially beautiful plants have already been brought to the notice of the members of the Union by the paper on the subject by Mr. A. W. Wills, in the "Midland Naturalist" for August, 1884. The subject has been under the consideration of the Management Committee at each of its meetings, and as the result the Council recommend that the following appeal be adopted by the Annual Meeting, and that Messrs. A. W. Wills, E. W. Badger, and Prof. W. Hillhouse be requested to take the necessary steps to bring it under the notice of the Natural History Societies of the country and of the public generally.

APPEAL.

It is a fact only too evident to the most superficial observer that many of our rarest and most beautiful native plants have already been or are being rapidly exterminated; and it may be assumed that this extermination will be viewed with regret—even with indignation—alike by the student and by the ordinary lover of natural beauty, and that both will be willing to assist, by all available means, in any measures which may afford the prospect of arresting its course.

The Council of the Midland Union of Natural History Societies asks serious attention to the following brief statement of the causes of the rapid destruction of British plants, and of what it ventures to suggest as the best means of mitigating the evil.

These causes appear to be mainly as follows:—

First.—The ravages of professional plant-hunters, who offer to the tourist or to the general public, by advertisement, plants attractive by reason of their beauty or of their comparative or absolute rarity.

The large dimensions which this traffic has assumed are indicated by the number of such advertisements which appear in some of the gardening periodicals, offering ferns from Devonshire, Cornwall, Somerset, the Wye Valley, &c., at from 4s. to 7s. 6d. per 100, in named varieties; *Hymenophyllum tunbridgense* and *H. unilaterale* at 2s. per square foot; various species of Orchis, Saxifrage, &c., at from 2s. to 5s. per 100; Bog Asphodel at 2s. per doz.; or inviting tenders for Primroses and Daffodils at so much per 100,000.

Second.—The operations of Exchange Clubs, the members of which are often asked to supply large numbers of the rare plants of their own districts in exchange for corresponding quantities of those of other neighbourhoods.

Third.—The indiscriminate or careless gathering of plants, often taken with their roots or in seed, by Botanists and their students in the course of botanical excursions.

Fourth.—The reckless gathering of large numbers of specimens by individual botanists.

Recognising that restrictive legislation or police interference are neither applicable nor desirable, the Council believes that it is by the indirect influence of example and the promotion of healthy public opinion that the evil in question can alone be combated.

They therefore earnestly urge the following considerations upon botanists, members of Field Clubs, Natural History and other Scientific Societies, upon all lovers of Nature and upon the public generally:—

First.—That they should rigidly abstain from encouraging or countenancing the purchase from professional plant-hunters of any native plants, for the sake either of their rarity or of their decorative value.

Second.—That botanists should resort to the assistance of Exchange Clubs, if at all, only for the purpose of obtaining single specimens necessary to fill up blanks in their herbaria, using such assistance with discrimination, and excluding from their operations plants of great rarity.

Third.—That all teachers should inculcate upon their pupils, by precept and example, the lamentable consequences of the wholesale or indiscriminate gathering of plants, especially with their roots or when in seed.

Fourth.—That individual botanists should seriously reflect on these consequences, and abstain from taking more than the smallest number of specimens indispensable for the purposes of genuine study, and even from taking any where the extermination of a particular species from a restricted habitat is threatened.

Fifth.—That tourists and amateurs should be urged to refrain from collecting plants of any degree of scarcity, especially when in flower or seed, it being impossible that ten per cent. of those gathered under such conditions can possibly live after removal.

Finally, the Council earnestly appeals to the editors of all journals devoted to Science and Art as well as to Horticulture and Floriculture and to those of the leading London and provincial papers to assist it in creating a healthy public opinion on this subject by the expression of their sympathy with the effort which the Council is making, and by refusing insertion to advertisements from professional plant hunters.

The Committee hearing that a Society has been formed in Geneva for the preservation of Alpine plants, adopted the following resolution, which was sent to the Secretary, from whom a number of the publications of the Society has been received.

Resolution—"The Committee of the Midland Union of Natural History Societies, deeply regretting the extermination of many of the native plants of Switzerland, desires to express its sympathy with the Société pour la Protection des Plantes, and to pledge the members of its own societies to contribute by all means in their power to the cause of the preservation of the native flora of that glorious land which has been the resort and the delight of so many of themselves and of their countrymen."

REVIEW OF PROGRESS.

In conclusion the Council wish to thank the Birmingham Societies for the excellent arrangements which they have made for the comfortable holding of the meeting of the Union; and feel that the second meeting in Birmingham affords an opportunity for looking back to the former meeting there in 1878, and for considering how far each of the component societies has grown since then, and how far they are now fulfilling the objects for which they then entered into association. While regretting that the apathy of the members, to which attention was directed in the last report still exists, the Council think they can see signs of a little improvement, and hope that all who are interested will try to do their utmost to further the progress of the Union. The need of the Union will mainly be felt by active workers—those who are trying to engage in some scientific investigation, in which they feel the necessity of the help and approval of their fellow-workers. To these, when they belong to

societies not publishing separate transactions of their own, the "Midland Naturalist" offers a ready means of communication with others, and it would be instructive to have the testimony of those whom the papers and notes in this journal have put *en rapport* with those at a distance who take an interest in the same pursuits. The Council are confident that the number of members who could thus testify to the usefulness of the Union would be no small one. They would invite any, who complain that their wishes are not met by what the Union has hitherto done, to make suggestions and propose improvements; but, at the same time, they would repeat that what is especially wanted, is a more extended and genuine interest in real scientific work, and the attention of the Societies in the Union should be directed to the spreading of this feeling among their members. If this were successfully done, there would at once result a larger attendance at the Annual Meetings, and more valuable contributions to the "Midland Naturalist," and the Union would be able to take the position which was intended by its projectors, as a real Midland Association for the Advancement of Science.

In the discussion on the adoption of the Report and on Mr. Wills's motion several members took part. A suggestion was made that the Union should be made the medium for more intercommunication of lectures and papers among the various Societies composing it. No formal vote was taken on this particular point, but there seemed an agreement that such an arrangement was desirable, and as the programmes for the Autumn Meetings will probably be soon in process of compilation, the Hon. Secretary will be glad to receive the names of gentlemen willing to visit Societies for the purpose of delivering lectures or reading papers if desired. Between Tamworth, Burton, and Birmingham there has already been such interchange to a small extent. In the list of papers read to the Tamworth Society are two by Birmingham gentlemen and one by a representative of the Burton Society, while the Birmingham Natural History Society has had the benefit of a paper from a visitor from Tamworth.

The Honorary Treasurer, Mr. E. de Hamel, then read his report, which showed, with some small arrears yet due, a balance in hand of £3 2s. 11d.

Votes of thanks were then passed to the Officers of the Union, and to the Officers and Members of the Birmingham Societies.

Mr. E. de Hamel was elected Honorary Treasurer, and Mr. T. H. Waller Honorary Secretary for the coming year.

The meeting closed with votes of thanks to the Bailiff and Council of the Mason College for the use of the Examination Hall, and to the Chairman.

THE CONVERSAZIONE.

This, which was also made the Annual Conversazione of the Birmingham Natural History and Microscopical Society, was held in the Town Hall, on Tuesday evening, July 16th.

Undoubtedly the most important part of the display was the large and beautiful collection of British Birds exhibited in the Great Gallery by Mr. R. W. Chase, President of the Society, and also of the Midland Union.

Many of these birds were very rare, including Rose-coloured Pastor, *Pastor roseus*; Snowy Owl, *Nyctea scandiaca*, from Caithness; Buffon's Skua, *Stercorarius parasiticus*, from Seaham Harbour; and Greenland Falcon, *Hierofalco candicans*, male and female, from Caithness. The most unique exhibits were a splendidly mounted pair of Golden Eagles, *Aquila chrysaetus*, male and female, from Uig, and a pair of White-tailed Eagles, *Haliaetus albicilla*, from Lewis. Another noteworthy specimen was a male King Eider Duck, *Somateria spectabilis*, from the Farne Islands, shot this year, and very rare. Among other rare specimens were also a Dartford Warbler, *Melizophilus undatus*, from Kent; an Osprey, *Pandion haliaetus*; two Goshawks, male and female, *Astur palumbarius*; Sabine's Gull, *Xema Sabini* (shot in Warwickshire); a Little Gull, *Larus minutus*, from Shoreham; *Motacilla flava*, and *M. alba*, Blue-headed, Yellow, and White Wagtails, from Brighton; *Sterna Dougalli*, Roseate Tern, from the Farne Islands; and *Hydrochelidon leucopetra*, White-winged Black Tern, from Norfolk. These cases were remarkable also for the fidelity with which they represented the details of the locality in which the birds were obtained. Mr. Chase also exhibited a large number of Eggs and Nests of British Birds, and over forty well-mounted pairs of Horns and Antlers from various parts of the world; also Nests of the Wood or Bush Wasp, and of the Hornet.

The floor of the hall was occupied by a display of about seventy microscopes, under which were exhibited many interesting objects, too numerous, however, to mention. Mr. T. Bolton exhibited an interesting collection of preserved specimens from Naples, illustrating Marine Zoology, and an example of Fish-hatching apparatus; Mr. G. St. John, an Observatory Hive, in which the Bees were seen at work; also Diagrams of the Anatomy of Bees, and their relations to flowering plants.

We can only make a selection from the exhibits in the side galleries. Mr. C. Beale, of Rowley Regis, showed a large number of Palæolithic and Neolithic Implements, including some rare ones in Jasper and Chalcidony, from Torontola, at the base of the Apennines; also some remarkable ancient Pottery, obtained from the old open coal workings at Tipton, Amblecote, and Wednesbury, attributed by the miners to the fairies. Mr. Beale also showed a large number of rare Fossils, from the Carboniferous and Silurian formations, many of them species not yet named. Mr. Horace Pearce, of Stourbridge, Crystals of Copper; Ammonites from the Lias, Whitby; Glacial Clay and Striated Stones; and specimens of erratic Boulders, etc. Mr. S. Price, a number of specimens of India-rubber from India, Java, Africa, &c., in various states of preparation; and foreign Butterflies, Moths, &c. Mr. H. L. Earl, M.A., of Sheffield, two Cases of Butterflies. Prof. T. W. Bridge, preserved specimens of Fishes, from the Mason College Museum. Mr. W. R. Hughes, a small collection of British and Foreign Corals, *Euplectella Aspergillum* (a beautiful sponge from the Philippine Islands), and *Spongia oculifera* (an allied fossil form). Mr. W. J. Harrison, Models used for teaching Physiology; also a number of Slides prepared for the Oxy-hydrogen Lantern to illustrate lectures; some Apparatus for teaching Electricity and Magnetism, devised by himself; and a simple arrangement for Photo-micrography; also Rocks and Fossils from the Coal Measures and Welsh Mountains. Mr. J. E. Mapplebeck, a large and well-arranged collection of living British Ferns, including many rare and novel varieties such as *Lastrea pseudo-mas Mapplebeckii*, and *Athyrium filix-femina minutissimum*, both found wild. Mr. W. H. Wilkinson, set of Lichens from the district and from Scotland, many

of which were beautifully in fruit. Mr. W. B. Grove, a small collection of Fungi growing on trees; also some comic sketches of Fungus forays and Portraits. Mr. S. Walliker, living Mosses, Lichens, and Ferns, from Devonshire, and mounted Sea-weeds. Miss France, a plant of Edelweiss, in bloom. Messrs. C. and A. Pumphrey, a very large number of Photographic Slides, prepared for the Oxy-hydrogen Lantern, including instantaneous Landscape Views and Microscopical Objects. Messrs. Alderman White, J. H. Stone, C. R. Robinson, and C. J. Watson, a large number of Landscape and Geological Photographs. Mr. T. J. Baker, four Calorimeters, demonstrating the following thermal facts:—(a) Atomic weights of different metals at the same temperature contain equal quantities of heat; (b) Equal weights of different metals at the same temperature contain unequal amounts of heat; (c) The relative amounts of heat absorbed by dissolving equal weights of different salts in water. Professor J. H. Poynting, Interference of Light by the Biprism. Mr. A. W. Haines, a small Dynamo-electric Machine, with Model Pump attached. Mr. Thomas Clarke, War Medals, obtained in the campaigns in China, Africa, New Zealand, Afghanistan, The Peninsula, &c.

Around the floor was arranged a collection of Diagrams for teaching Physiological Botany, lent by Prof. Hillhouse.

In a separate room Mr. C. Pumphrey exhibited by the Oxy-hydrogen Lantern, at 8 p.m., a series of Photographs of the Yellowstone Park and Niagara taken by himself during his visit to Canada and the United States in 1884; and at 9 p.m., a number of Photo-Micrographs.

The Hall was illuminated by the electric light, and there was a fairly good attendance of visitors and members of the Midland Union, chiefly, however, those residing near Birmingham.

TEACHERS' CONVERSAZIONE.

On Thursday evening, June 18th, the Town Hall was crowded in every corner by the Elementary School Teachers of Birmingham and the immediate neighbourhood, who appeared to derive great pleasure from an inspection of the numerous and attractive exhibits. It was a happy thought on the part of the Birmingham Natural History and Microscopical Society to invite those who are engaged in the work of education in the town to examine the extensive display of natural history specimens, microscopes, &c., which had been got together as part of the eighth annual meeting of the Midland Union of Scientific Societies. About 1,500 invitations were issued, and from the throngs of visitors who filled the building as soon as the doors were opened it would appear that few, if any, of those invited were absent. Mr. Pumphrey's capital lantern lectures on America and on Photo-micrography were listened to with marked attention, and Mr. Chase's magnificent collection of British birds attracted general admiration. Every visitor appeared anxious to make the complete round of the grand exhibition of animate and inanimate objects displayed under the microscopes, and the exclamations of astonishment at the wonders revealed were neither few nor faint. From the general and obvious interest excited it cannot be doubted but that a most pleasant evening was spent by the teachers, and that they would carry away a better knowledge of the attractiveness of scientific pursuits than many of them previously possessed. As one connected with the teaching profession of this town, the writer desires, on behalf of his fellow teachers and at the request of many of them, to tender to the Natural History Society their earnest thanks. It crossed the minds of some how great a pleasure it would give to the elder children of our public schools if they, too, could have an opportunity of seeing some of the

secrets of Nature, so well revealed! If the Society could see their way to do any such work—and they might well ask the town to help them—it would be sowing seed whose produce could hardly be over-estimated.

EXCURSION TO THE LICKEY HILLS.

The members who had chosen the excursion to the Lickey Hills left Snow Hill Station by the 10 a.m. train, and were joined at Old Hill by a contingent from Stourbridge. Mr. W. J. Harrison, F.G.S., acted as leader, and the party included the Rev. A. Watson, J. Grayston, F.G.S. (Tamworth), J. W. Bodger (Peterborough), Rev. G. St. Clair (Birmingham), Messrs. Marten, Worthington, Madeley, Perry, &c. (Stourbridge), Rev. J. H. Thompson (Cradley), being altogether about twenty in number. On getting out at Rubery Station, the fine section of quartzite, crossed by a well-marked fault, which is exposed in the railway cutting, was first examined. Walking southwards, the junction of the Llandovery sandstone with the quartzite (which is of either Cambrian or Pre-Cambrian age) in the road-cutting nearly opposite the asylum gates was next studied. The sandstone is crowded with casts of *Pentamerus*, &c., but the quartzite is quite unfossiliferous. The brook section in the asylum grounds came next, where the Silurian shales and limestones—resting on the Llandovery—are fairly well exposed. From this point the walk extended along the ridge to Rednal, many fine sections being seen on the way; south of Rednal the quartzite is fairly contorted, being here close to the line of fault which runs along the eastern side of the ridge. At Kendal End the patch of Silurian limestone—long since noted by Murchison—was found, and in the hollow where it lies some good plants delighted the botanists. Nearer to Barnt Green the party walked through the beautiful grounds of Barnt Green House (by kind permission of W. A. Thompson, Esq.), and found the Pre-Cambrian strata (volcanic rocks which *underlie* the quartzite) exposed along the brook course. At this point the party divided, some returning to Stourbridge, while the remainder took the Midland train from Barnt Green to Birmingham. The weather was excellent for walking—fine, but not sunny—and the day proved a very enjoyable one.

EXCURSION TO COVENTRY AND KENILWORTH.

An agreeable party of thirty-four, under the guidance of Mr. J. Levick, travelled in a carriage reserved for them by the L. & N.-W. Ry. Co., from New Street to Coventry, reaching the latter place soon after ten o'clock. Here they were met by Mr. W. G. Fretton, F.S.A., who conducted the party over this interesting city, and whose life-long study of the Archaeology of England rendered him eminently qualified for this position. The party visited the site of the Cheylesmore Manor House; Grey Friars Spire, now attached to Christ Church, all that remains of the Franciscan Monastery; Ford's Hospital, the magnificent timber work of which was much admired; St. Michael's Church, with its lofty and graceful steeple, built of red sandstone, and upon which the touches of "Old Father Time" are only too clearly seen in the crumbling of the outer casing of this graceful fabric. St. Mary's Hall was a place of much interest to the party, with its tapestry, pictures, armour, and collection of ancient MSS. They then visited Holy Trinity Church, remains of the Benedictine Priory and Cathedral, remains of city walls and gates, St. John's Hospital, now the Free Grammar School, where the boys (who were

enjoying their luncheon) were evidently as much amused at the curiosity of the party as the party was in viewing their ancient buildings. They next passed Batlake Hospital, and having inspected St. John's Church, they reached the Craven Arms Hotel, where a good luncheon was provided. At one o'clock the party left this historic city with feelings of increased veneration after the interesting survey they had made of its many remains of ancient times. They proceeded by coach and wagonettes along the Warwick Road, with its graceful avenues of oak, to Stoneleigh, where they alighted to view the ancient church. Driving past the Abbey, the magnificent seat of Lord Leigh, they proceeded through the Deer Park and Thickethorne Woods to Kenilworth. Here the services of Mr. Fretton were again most welcome, as he pointed out the various spots of special interest in those picturesque old ruins, recalling the eventful incidents connected with them. After viewing the remains of the Priory and the Parish Church, they reached the station, having spent a very interesting and enjoyable day.

EXCURSION TO CANNOCK CHASE.

This was attended by about sixteen persons, under the guidance of Messrs. J. Brown and W. B. Grove. On descending from the train, which, by the kindness of the L. and N.-W. Ry., was stopped at Anglesea siding for the purpose, the party was conveyed by the Cannock Chase Company's engine to No. 4 Colliery, which most of them descended. On reascending, Mr. W. H. Duignan led them through Court Bank Cover, where they saw the slag of the old iron workings and the oaks which were lopped for fuel. They then walked through Beaudesert Park to Castle Rings, a British fort on Cannock Chase, and saw the foundations of (probably) a Norman castle, which was, at any rate, partly built within the enclosure. After lunch at Hednesford, they returned to Birmingham by 6.15.

THE UPPER LIAS OF NORTHAMPTONSHIRE.

By B. THOMPSON, F.C.S., F.G.S

Part III.

THE SERPENTINUS-BEDS.

THE sub-zone which I propose to describe under the name of the *Serpentinus-beds* is found immediately above the *fish and insect beds* where these latter are developed, or resting directly on the Marlstone where they are absent. The beds are named "*Serpentinus*" on account of the abundance in them of *Ammonites Serpentinus*, a member of the group of the *falciferi*.

In the district to which I shall particularly direct attention in this paper, the sub-zone consists of two beds only, the lower one a clay, and the upper a limestone. *Ammonites* and *belemnites* are so exceptionally abundant in the limestone bed, in most places, that it is commonly called in this district the *Cephalopoda-bed*, or better, the *Lower Cephalopoda-bed*, to distinguish it from a somewhat similar bed in the next sub-zone, in which *ammonites* of the group of the *planulati* are at times abundant.

The term *Cephalopoda-bed* has been applied to a number of beds in the Jurassic rocks; for instance, Mr. Moore called all the beds of the Upper Lias, above his Saurian and Fish Zone, the Upper Cephalopoda beds. These, at Ilminster, where he first studied them, are only about 8 feet in thickness, but they include much more than I intend Lower Cephalopoda-bed to do. The Cephalopoda-bed of Dr. Wright is at the top of the Midford Sands, and so probably should be placed in the Inferior Oolite rather than Upper Lias. I follow a precedent in the use of the term "*Lower Cephalopoda-bed*," but would again point out that it means the hard bed, nearly at the base of the Upper Lias, between the "*Fish and Insect-beds*" and the "*Communis-beds*," in which Cephalopods are abundant. In other districts, further north, there appears to be more than one such bed in this sub-zone; they might all perhaps be included in the term "*Lower Cephalopoda-beds*."

THE CLAY-BED would probably be best described as a *clay-marl*. It is of a dark blue colour, like the great mass of the Upper Lias clay, when dug from a good depth, but on exposure it gets very light-coloured, almost white, and when dry cracks in all directions, producing roughly cubical masses. It very readily crumbles down in water. A small piece held quietly, just touching the surface of some water in a basin, continued to

give off quite a shower of little flakes until it had nearly disappeared. Being so very porous it is at least a little singular that a fresh fracture in one of the nearly white lumps often shows a very dark purplish surface, resembling the interior of a piece of the Cephalopoda-bed freshly broken. From its light colour, and particular mode of breaking up when desiccated, it might be inferred that this bed contains a good amount of carbonate of lime—this is the case; it effervesces considerably when treated with an acid. I have never seen it used for brickmaking in this county, and doubt whether it could be used for that purpose, owing to the lime that would be formed in burning it.

This bed in Northamptonshire contains a large number of small white concretions, but it is exceedingly unfossiliferous, thus presenting a great contrast to the Serpentinus clays in some other places where I have seen them—Lincoln for instance, and even in the neighbouring county of Oxford.

Occasionally small ammonites may be found on this clay, and give one the impression that they belonged to the bed, but I believe in every case in which I have so found them they have been washed down from the “Communis” clays above. Some foraminifera are found in it. The thickness varies from one or two inches to between four and five feet.

THE LOWER CEPHALOPODA BED is a limestone of a coarser texture than the Fish-bed. It contains a large number of ammonites of the false group, such as *Ammonites serpentinus*, *A. Lythensis*, *A. exaratum*, and these often of large size, though it is by no means uncommon to find also a good number of ammonites of the “planulate” group. It varies from dark blue to a light yellowish colour, according to the amount of exposure to which it has been subjected. Even the lightest coloured pieces exhibit a bluish or violet-coloured interior when moderately thick. The upper surface of the bed is sometimes very irregular, as though it had been water-worn, and the fossils are very indifferently preserved in these places; this weathering may be simply a result of the percolation of water through the rather thin overlying marl. Fucoids seem to be rather abundant in it over a considerable area, and also small white rounded concretions.

In the neighbourhood of Market Harboro’ it is sufficiently ferruginous to be at times mistaken for the Middle Lias Rock-bed.

Of the numerous sections in Northamptonshire in which the “*Serpentinus*” beds may be seen, I have selected the one given below as a type, because it is as good as any other I can think of, and it can be better examined at the present time than most. Beds 2 and 3 can be best seen on the railway bank just south of Byfield, close to Priors Marston road bridge, and all below best in a small quarry about 100 yards away, on the south side of the railway.

SECTION ON THE EAST AND WEST JUNCTION RAILWAY SOUTH OF BYFIELD.

		ft.	in.
	1. Soil		
	2. CLAY, mixed with sand and gravel, apparently very unfossiliferous, but badly exposed, about...	3	0
"Communis" Beds.	3. UPPER CEPHALOPODA-BED. A flaggy limestone, whitish surface, violet interior, containing:— <i>Ammonites communis</i> , <i>A. bifrons</i> , <i>A. Holandrei</i> , <i>A. serpentinus</i> ? <i>Belemnites</i> , <i>Pectens</i> , <i>Astarte</i> . Fewer fossils than in bed No. 5, and such as are found much more abundant in lower part of the bed than upper	0	6
	4. CLAY-MARL, breaks up into cubical blocks, somewhat like No. 6, light coloured, but evidently more clay in it than No. 6, also many more little white concretions, containing:— <i>Ammonites communis</i> (abundant), <i>A. bifrons</i> , some small " <i>falcifer</i> " ammonites, <i>Belemnites</i> , <i>Astarte</i> . <i>Pentacrinite stems</i> (numerous)	3	0
"Serpentinus" Beds.	5. LOWER CEPHALOPODA-BED. A yellowish, hard, sandy limestone, dirty violet-coloured interior, not flaggy, seems in places to be made up of three layers, many white concretions, containing:— <i>Ammonites serpentinus</i> , <i>exaratus</i> , etc., (<i>large</i>), <i>A. Holandrei</i> , <i>A. communis</i> , <i>A. Levisoni</i> ? <i>Belemnites</i> , <i>Fucoid markings</i> ...	0	9
	6. LIGHT COLOURED MARL, nearly white, streaked with red in places, not very homogeneous in composition, breaks into cubical masses, easily crumbles down, freshly exposed surfaces often dirty violet colour, many little concretions. One specimen of <i>A. communis</i> , and traces of a <i>belemnite</i> or two, except near the bottom. See No. 7		
"Fish and Insect" Beds.	7. SHALE, scarcely distinguishable from bed above, containing:— <i>Flattened ammonites</i> , <i>Belemnites</i> , <i>Fish scales</i>	0	1
	8. FISH-BED. Somewhat nodular, nearly white exterior, dark purplish interior in places, not a continuous bed, containing:—Many " <i>planulate</i> " ammonites, a few " <i>falcifer</i> " ones, large <i>Belemnites</i> , <i>Euomphalus minutus</i> , <i>Gasteropods</i> , <i>Fish fragments</i> , <i>Wood</i> , etc.	0	4

"Transition" Bed.	9. Layer of dark blue and red sandy clay, very much mixed up. No fossils noticed	ft.	in.
		0	3
"Spinatus" Zone.	10. TRANSITION-BED. Part of it a yellowish sandy layer, in which the fossils are only casts; part a hard marly layer, from which a few fossils could be obtained:— <i>A. acutus</i> , <i>Macrodon</i> , <i>Gastropods</i> , etc.	0	4
	11. ROCK-BED OF MIDDLE LIAS. Very sandy, containing much iron, layers of "Jacks," patches made up of <i>ossicles</i> . Fossils in sandy part only casts. Several irregular, inconstant partings of red sand. <i>Usual Fossils</i> . <i>Waldheimia resupinata</i> rather abundant	6	0

In travelling over those districts where the Middle Lias Rock-Bed has been much used, it is still possible to find a number of sections that have not been covered up, and most of these have a capping of Upper Lias clay in which traces of the "Serpentinus" beds may be found.

A little south of the village of THENFORD there are two small Marlstone quarries, and in one of them the Lower Cephalopoda-bed, with its underlying clay, may be well seen. (1) The hard bed is a whitish limestone containing many ammonites of the *falcifer* group, together with some of the planulate ones, and a few belemnites. It has a thickness of about 4 inches, and the underlying marly clay about 10 inches. A small and long disused Marlstone quarry, to the west of the village, has a thin capping of clay, in which, and in the soil, are fragments of the Lower Cephalopoda-bed. It is there a light coloured stone containing very few fossils, nevertheless two that I have not found elsewhere, a small *Lima* and *Tancredia*?

At MIDDLETON CHENEY (2) the limestone bed is 6 inches in thickness, and the underlying clay 1½ inches. There are two sections very near to each other, one called the Rectory pit, and another in an adjacent field (Mrs. Tomes' pit). The limestone at the former shows *fucoid markings*, and contains "*Falcifer*" ammonites and *Nautili*; and at the latter I obtained *Dentalium liassicum* (Moore), and a rhynchonella, which is probably *R. Jurensis* (Quenst.)

The beds are again met with at CHIPPING WARDEN, (3) APPLETREE, and ASTON-LE-WALL, (4) but in neither of these localities was anything observed calling for special mention, and the same remark applies to a section near to WARDEN GRANGE, and one to the south-west of BYFIELD.

On STIRCH FARM, about a mile S.S.W. of Hellidon, is an old Marlstone quarry presenting a section somewhat as below.

(1.) For Section see Vol. I., page 287.

(2.) For Section see Vol. I., page 288.

(3.) " " " Vol. II., " 243.

(4.) " " " Vol. II., " 245.

SECTION AT STIRCH.

Upper Lias.	{	1. Soil and clay, with remnants of LOWER CEPHALOPODA-BED.
		2. Whitish marly clay. No fossils seen. About 2 feet in thickness.
Middle Lias.	{	3. FISH-BED. No fish remains detected, but in all other respects resembling the same bed at Byfield.
		4. TRANSITION-BED. Mostly hard, containing <i>A. acutus</i> and other fossils characteristic of the bed.
		5. ROCK-BED, with usual fossils.

A good deal of Marlstone has been quarried around HELLIDON, but most of the quarries are obscured; one, however, has been opened again recently, in a field just south of the village, in which the *Serpentinus*-beds are well shown.

SECTION AT HELLIDON.

			ft.	in.
"Communis" bed.	{	1. Soil and bluish-grey clay, containing some small ammonites and belemnites... ..	1	6
		2. LOWER CEPHALOPODA-BED, a soft sandy bed, weathering red on the exterior, containing few fossils:—"Falcifer" and " <i>planulate</i> " ammonites and a few <i>belemnites</i>	0	6
"Serpentinus" Beds.	{	3. Whitish marly clay, almost exactly like the same bed at Byfield. No fossils seen	3	2
		4. A thin layer almost exactly like the bed above, in fact no difference can be detected except by a close inspection, then it seems a little more shaly and is seen to contain numerous ammonites, <i>Ammonites Holandrei</i> , and probably <i>A. Communis</i> . This layer probably represents some portion of the FISH AND INSECT-BEDS ...	0	1
Upper Lias.	{			
Middle Lias.	{	5. ROCK-BED. A hard rock in large blocks, very little broken up by fissures—seems like a good building stone—containing the usual fossils:— <i>Terebratula punctata</i> , <i>Rhynchonella tetrahedra</i> , <i>Pecten liasinus</i> , etc.	3	0

Fragments of the Lower Cephalopoda-bed may be found also at the top of the Marlstone quarries at CATESBY, near to ARBURY HILL, and at BADBY. At the latter place the Cephalopoda-bed is rather fragmentary, and in places rests directly on the Middle Lias Rock-bed, indeed I have one piece of stone by me which shows Upper Lias fossils on one side, and Middle

Lias ones the other. The bed here is succeeded in an upward direction by a marly clay containing many little ammonites, and it has yielded :—

<i>Planulate ammonites</i> (abundant)	<i>Unicardium globosum?</i>
<i>Belemnites</i>	<i>Pentacrinite</i>
<i>Avicula substriatus?</i>	<i>Serpulæ, etc.</i>

At WELTON there are three sections in which the Lower Cephalopoda-bed has been exposed, and two in which it can now be seen. They are all very close to each other, and about half-a-mile west of the village. In the two where it can now be seen it is situated just on the top of the Middle Lias Rock-bed in two small stone-pits, and is a light yellowish sandy bed, containing many ammonites of the "falcifer" group, with some planulate ones, also a few gasteropods. It is capped by a light grey clay, containing small ammonites ("*Communis*" bed). These two sections are situated on an outlier of Middle Lias, and between them is a considerable patch of Upper Lias, which has been let down and preserved by a "fault;" the fault appears to run nearly east and west. Neither the fault nor the Upper Lias outlier are marked on the Survey maps. I have reason to believe that the Serpentinus clay as well as the Lower Cephalopoda-bed are preserved here, although the former is absent in the adjacent quarries. The clay is only worked to the base of the "*Communis*" beds, and so the section will appear later on, but the men informed me that there was a good thickness of clay below. The Cephalopoda-bed here has yielded :—*Ammonites serpentinus* and others of same group, many *Belemnites*, *Cardinia*, *Waldheimia Lycetti*, *Rhynchonella Bouchardi*, *Astarte*, *Pentacrinite*, etc.

On the railway between Long Buckby and Crick stations, and near to WATFORD, the Lower Cephalopoda-bed is well developed, and may be followed along the banks, on both sides of the railway, for a considerable distance. (1) It is one of the few places where gasteropods are rather abundant. The stone is here rather sandy, and so the fossils weather out and stand in relief on the edges; it has a bluish interior where it is fairly thick. The fossils obtained here are :—*Ammonites serpentinus* and others of the same class, *A. Raquinianus*, *A. communis*, *Rhynchonella Bouchardi*, *Rhynchonella*, sp.? *Cerithium coronatum*, *Cerithium liassicum*, *Nerinea liassica*, *Actæonina marginata*, *Dentalium liassicum*, etc.

There is, or rather was, a very fair exposure of the Serpentinus-beds near to PRESTON CAPES; the quarry in which they are found is in the valley, a little north of the village, and although in a very bad condition for examination on account of long disuse, on the occasion of my visit, I believe the section given below is fairly accurate.

(1). For Section see Vol. II., page 192.

SECTION AT PRESTON CAPES.

		ft.	in.
"Com- munis" Clay.	1. Soil	0	10
	2. Marly clay — small specimens of <i>A. communis</i> most abundant	1	6
"Serpentinus" beds.	3. LOWER CEPHALOPODA-BED. A limestone full of small concretions in places, and containing many "plunulate" ammonites, also <i>A. bifrons</i> and <i>Amberleya capitaneus</i>	0	11
	4. Marly clay. On the surface many small ammonites as in No. 2. I believe these had been washed down from above	2	6
	5. FISH-BED. A limestone consisting of lens-shaped masses, with purple interior. Fossils usually found in this bed were not detected	0	9
	6. Marly clay passing downwards into a red and stiffer clay.		
	7. ROCK-BED, much obscured. <i>Ossicles</i> abundant in layers.		

I could find no decided Transition-bed here, but in the clay just above the Rock-bed were a good number of small pectens, encrinite stems, gastropods, and a few small rhynchonellæ. All the beds were much obscured with the exception of the limestone bands.

BUGBROOK and ROTHERSTHORPE have each yielded a good many fossils from the Cephalopoda-bed, though there are no sections now open where it can be seen. I have found it in stone heaps at both the places mentioned, and in situ at the back of the church at Bugbrook, just above the Rock-bed. There are some fine large specimens of *A. serpentinus* from each of these localities in the collection at the Science School; they are labelled "Marlstone," but there can be no mistake as to their proper position.

The hard bed is in all probability to be found at HARPOLE a little below the surface, for a very good specimen of *Ammonites Lythensis* was recently brought me from that neighbourhood, that had been dug up in draining.

At MILTON, about a mile south-east of Rothersthorpe, the *Serpentinus* beds are to be seen, and have been well exposed, (1) the clay having a greater thickness in the village, than I have elsewhere recorded it, viz., 4ft. 6in. It is somewhat singular that this same bed is reduced to an inch or two half-a-mile nearer Northampton. I think it must be recent denudation that has produced this change, because the Cephalopoda-bed seems much water-worn, and there is not much clay above (clay and soil together less than 3 feet).

(1). For Section see page 189.

Under NORTHAMPTON the Serpentinus-beds seem to be pretty well developed ; the clay is about $2\frac{1}{2}$ feet in thickness and the Cephalopoda-bed about 6in. The hard bed has yielded *Ammonites serpentinus*, *A. subcarinatus*, *Nautili*, etc.

PALÆONTOLOGY.

I described the clay bed of this sub-zone as exceedingly unfossiliferous ; this is the case so far as readily observed fossils are concerned, there are certainly very few to be detected in an ordinary examination of it. I do not wish it to be inferred that there are no fossils in it, for it has yielded a fair number of *foraminifera*, although at present I am not able to give a list of them ; also, I have found fragments of both ammonites and belemnites. In Lincolnshire, the Serpentinus clays are very fossiliferous, but the fossils are chiefly such as we find in a higher zone in Northamptonshire ; for instance, taking two abundant and fairly characteristic fossils of the Serpentinus-beds at Lincoln, *Belemnites subtennis* and *Cerithium costulatum*, the former is rarely or never found out of the Communis-beds with us, and the latter has not yet been found out of the *Leda ovum beds*, though it is found near the base of them.

At Bloxham in Oxfordshire, and not far beyond the borders of Northamptonshire, the Serpentinus-beds are very fossiliferous, large numbers of small falcifer ammonites can be picked out of the clays just above the rock-bed. From this place I have obtained *A. bifrons*, *A. Holandrei*, *Nautili*, *Rhynchonella Jurensis*, *Nucula Hammeri*, *Diplocideris desori*, etc.

From what has been said it will be evident to all that nearly the whole of the fossils given in the list came from the Lower Cephalopoda-bed. *Reptiles* and *fish* are very rare, *cephalopods* very abundant ; the other fossils on the whole scarce, but may be abundant in one or two localities, thus nearly all the gasteropods are from Watford and Welton. The only ammonite I have found in this sub-zone and no other, is *Stephanoceras Raquinianum*, and the only gasteropod *Amberleya capitaneous*. The same remark applies to the brachiopods *Waldheimia Lycetti*, *Rhynchonella Jurensis*, and a small *Rhynchonella*, which is probably a new species, and the echinoderm *Diplocidaris desori*.

Foraminifera would probably be found to be more abundant in the Cephalopod-bed than the underlying clay if they could be got at. I have one ammonite from Rothersthorpe almost covered with *Nubecularia sp.?* ; it has on it also another larger organism which is probably a parasitic brachiopod.

LIST OF FOSSILS FROM THE SERPENTINUS BEDS OF
NORTHAMPTONSHIRE.

REPTILIA.

SAURIAN VERTEBRA. A single vertebra obtained from the limestone bed at Watford, by Mr. W. D. Crick, is all I have to record under this head.

CEPHALOPODA.

HARPOCERAS SERPENTINUM (*Reinecke.*) *Ammonites fulcifer* (*Sow.*), *A. Strangewaysi* (*Sow.*), *A. Mulgravius* (*Simp.*) This is the characteristic ammonite of the "Serpentinus" zone, and it is at times very abundant. It is somewhat difficult to get good specimens, however; the one figured is a very good type of this ammonite as it occurs in Northamptonshire. The characters by which it is distinguished are these:—It is a compressed, discoidal shell, the whorls slightly convex, and covered with about 100 highly-flexed ribs, which end in a prominent keel; the inner border of the whorls is abruptly truncated at the umbilical margin. A shallow depression or sulcus runs round the whorls rather nearer the inner than the outer margin.

HARPOCERAS BIFRONS (*Brug.*) *Cornu ammonis* (*Lister, etc.*), *Ammonites Walcottii* (*Sow.*), *A. Hildensis* (*Y. & B.*) Rare in these beds.

HARPOCERAS LEVISONI (*Simp.*) *Ammonites borealis* (*Seeb.*), *A. comensis* (*Reynes*). Rather rare.

HARPOCERAS LYTHENSE (*Young & Bird*). *Ammonites Lythensis* (*Y. & B.*), *A. concavus* (*d'Orb.*)

HARPOCERAS PRIMORDIALE (*Schl.*) *Ammonites ovatus* (*Y. & B.*), (*Simp.*) Specimen from Catesby.

HARPOCERAS EXARATUM (*Young & Bird*). *Ammonites complanatus* (*d'Orb.*), *A. subplanatus* (*Dumort.*)

PHYLLOCERAS SUBCARINATUM (*Young & Bird*). *Nautilus subcarinatus* (*Y. & B.*) Several specimens were found in the material thrown out during the excavation of new headings at the Water Works in Northampton. I believe they came from the Lower Cephalopoda-bed, but they might have come from the "Communis" hard bed. I have found none elsewhere in the county.

STEPHANOCERAS COMMUNE (*Sow.*) *Ammonites angulatus* (*Sow.*)

STEPHANOCERAS HOLANDREI (*d'Orb.*)

STEPHANOCERAS RAQUINIANUM (*d'Orb.*) This appears to be rather a rare species. The only specimens I have are from Watford.

NAUTILUS ASTACOIDES (*Young & Bird*). This is named from a rather bad specimen, but the umbilicus is very small, and one small portion of the shell shows longitudinal markings but no transverse ones, such as may be generally seen on *N. striatus*.

BELEMNITES are by no means rare in this sub-zone, nevertheless it is difficult to get good ones, and I find that I have none that I should feel any confidence in naming.

GASTEROPODA.

DENTALIUM LIASSICUM (*Moore*).

CERITHIUM CORONATUM (*Moore*).

CERITHIUM LIASSICUM (*Moore*).

CERITHIUM sp.? A part of a smooth and rather large cerithium which may probably be *C. planum* (*Moore*).

NERINEA LIASSICA (*Moore*).

AMBERLEYA CAPITANEUS (*Goldf.*) *Turbo capitaneus* (*Goldf.*)

ACTEONINA MARGINATA (*Simp.*) *Tornatella capricorni* (*Tate*).

*SOLARIUM sp.?

LAMELLIBRANCHIATA.

LIMA sp.? A very small specimen, much resembling *Lima punctata*.

MONOTIS SUBSTRIATUS (*Münster*). *Avicula nitescens*? (*Simp.*)

PECTEN sp.? A beautifully marked shell, but imperfect.

PECTEN PUMILUS (*Lam.*)

NUCULA HAMMERI. (*Defrana*).

ASTARTE PARALLELA (*Moore*). Several examples from Watford.

UNICARDIUM GLOBOSUM (*Moore*)?

LUCINA BELLONA (*d'Orb.*) *Lucina librata*, var. *transversa* (*D'Archiac*).

This fossil so closely resembles the one figured by Morris and Lycett from the Great Oolite that I think it must be the same species.

CARDINIA CONCINNA (*Sow.*)? *Pachyodon lanceolatus* (*Stuch.*)?

TANCREDIA?

BRACHIOPODA.

WALDHEIMIA LYCETTI (*David*).

RHYNCHONELLA JURENSIS (*Quenst.*)

RHYNCHONELLA BOUCHARDI (*Dav.*)

RHYNCHONELLA sp.?

ECHINODERMATA.

DIPLOCIDARIS DESORI (*Wright*).

PENTACRINITE.

ANNELIDA.

SERPULA.

FORAMINIFERA.

*NUBECULARIA TIBIA (*J. & P.*)*SPIROLOCULINA INFRAOLITICA (*Terq.*)*DENTALINA GUTTIFERA (*d'Orb.*)

PLANTÆ.

FUCOIDS.

JET.

- * Quoted from "On some Middle and Upper Lias Beds in the neighbourhood of Banbury," by Edw. A. Walford.

DESCRIPTION OF PLATE.

Fig. 1. HARPOCERAS SERPENTINUM (*Rein.*) Less than one half natural size.

„ 2, 2A. STEPHANOCERAS RAQUINIANUM (*d'Orb.*)

„ 3. AMBERLEYA CAPITANEUS (*Goldf.*) A very good specimen obtained from the Lower Cephalopoda-bed, at Preston Capes, by Mr. W. D. Crick.

„ 4, 4A, 4B. WALDHEIMIA LYCETTI (*Dav.*)

„ 5, 5A, 5B. RHYNCHONELLA BOUCHARDI (*Dav.*)

NOTE.—Since I returned the first proofs of this paper, Dr. Thos. Davidson, F.R.S., so well known for his classical work on the "British Fossil Brachiopoda," has very kindly examined the little Rhynchonella from Watford, which I thought might be new, and he says with regard to it:—"I have carefully looked through my collection, and have not the shell, nor is it described in my work. It is new to me, and seems a good little species, which you might name and describe."

METEOROLOGICAL REPORT AND OBSERVATIONS, 1885.

APRIL.

THE conditions of weather experienced this month were of a very variable character. From the commencement until after the middle of the month cold easterly winds prevailed, and vegetation was much retarded in consequence; but the latter part of the month was much warmer, and a fair amount of bright sunshine and occasional rains combined to produce rapid growth of vegetation. The mean temperature for the month, 46° , was 2° below the average, the variations being from 72° on the 21st to 25° on the night of the 5th. The rainfall, 2.10 inches, was 0.30 of an inch above the average of the last 16 years. Snow fell on the 15th. The barometer varied from 28.97 inches on the 6th to 30.07 inches on the 19th. Swallows were first seen on the 17th. The Cuckoo was first heard at Harlestone on the 21st, and near Little Houghton on the 23rd. The Nightingale first heard near Wootton on the 26th.

MAY.

May is generally noted for its treacherous weather; this year has been no exception to the rule, for it has been very cold,— 4° below the average—dull, wet, and exceptionally uncongenial. Slight thunder was heard at intervals during the month; and snow fell on the 7th. The temperature varied from 72° on the 28th to 30° on the night of the 8th, the mean for the month being 49° . The rainfall, 2.52 inches, was excessive, being 0.87 of an inch above the average of the last 16 years. The variations of the barometer were from 30.00 inches on the 12th to 29.05 inches on the 22nd. Westerly winds with a slight touch of east prevailed throughout the month.

JUNE.

The weather for this month has been dry and seasonable; although cold winds have been of frequent occurrence, the temperature was up to the average. The heavy rain on the 8th, combined with the warm days which followed, has proved a vast benefit to the farmer, in some cases nearly doubling his hay crops. The mean temperature for the month was 59° , the variations being from 87° on the 4th to 38° on the night of the 11th. The rainfall, 1.89 inch, was very light, being 0.39 of an inch below the average of the last 16 years. The barometer varied from 30.20 inches on the 11th to 29.30 on the 20th.

F. LAW.

APRIL, 1885.

STATION.	OBSERVER.	RAINFALL.					SHADE TEMPERATURE.			
		Total for Month.	Total for Year.	Greatest Fall.	Wet Days.	In. Date.	Maximum.		Minimum.	
							Deg.	Date.	Deg.	Date.
Northampton ..	H. Terry	2.05	7.88	0.88	15	11	65	29	27	4
"	F. Law	2.10	7.18	0.91	15	12	72	21	26	5
Castle Ashby ..	R. G. Scriven	2.22	7.63	0.80	15	12	75	20	28	4
Litchborough ..	Ed. Grant	2.77	9.21	0.72	15	16	75	19	22	4
Sedgebrook	C. Markham	2.40	7.71	1.04	15	13	71	21	29	5
Rothwell	J. More, M.D.	2.17	6.69	0.80	15	16	..	..	..	..
Oundle	S. P. Holloway	1.66	5.89	0.50	28	12	..	..	..	..
Towcester	P. Phipps, M.P.	2.07	7.60	0.74	15	12	..	..	..	..
Little Houghton	J. Brawn	2.22	7.43	0.90	15	13	61	22	36	4
Fawsley	Lady Knightley	2.55	7.47	0.78	15	16	62	21	24	4
Thorpe Man'ville	Seth Baines	2.49	8.82	0.72	21	12	72	21	25	5
Twywell Rectory	Rev. H. Waller	2.04	5.99	..	..	..	..	..	..	..
Floore	E. G. Loder	2.22	7.84	0.82	15	11	70	20	20	4
Whittlebury	W. S. Miller	2.49	8.95	0.74	15	15	69	21	29	4
Hazelbeach	Mrs. Albert Pell	2.82	8.09	1.25	15	13	69	28	27	4
Rockingham.Cstl.	H. Wate	2.07	6.97	0.50	16	11	73	27	20	4
Holdenby	Rev. F. C. Alderson ..	2.35	7.41	0.96	15	15	..	..	..	..
Kettering	C. W. Lane	2.13	6.89	0.79	15	16	69	21	25	5
Peterborough ..	J. Whitwell	1.80	5.88	0.46	28	12	71	21	26	3 & 4
Maxey Vicarage.	Rev. W. D. Sweeting ..	1.70	5.59	0.48	28	15	..	..	..	..
Av. 19 yrs 1866-84	H. Terry	1.78	7.54	..	..	..	..	..	..	..

MAY.

Northampton ..	H. Terry	2.44	9.82	0.44	21	15	63	28	82	7
"	F. Law	2.52	9.70	0.48	22	16	72	28	80	8
Castle Ashby ..	R. G. Scriven	2.36	9.99	0.49	5	14	68	27	80	7
Litchborough ..	Ed. Grant	2.26	11.47	0.52	25	19	70	28	80	6
Sedgebrook	C. Markham	2.49	10.20	0.47	22	16	68	28	80	7 & 12
Rothwell	J. More, M.D.	2.15	8.84	0.40	5	17	..	..	..	..
Oundle	S. P. Holloway	2.26	8.15	0.32	21	17	..	..	..	..
Towcester	P. Phipps, M.P.	2.46	10.66	0.49	21	13	..	..	..	..
Little Houghton	J. Brawn	2.64	9.97	0.60	22	17	63	28	40	8
Fawsley	Lady Knightley	2.20	9.67	0.46	6	21	65	28	81	7
Thorpe Man'ville	Seth Baines	2.71	11.53	0.49	25	13	79	27	29	8
Twywell Rectory	Rev. H. Waller	2.10	8.09	0.48	22	..	..	..	..	..
Floore	E. G. Loder	2.66	10.50	0.56	22	11	68	28	80	11
Whittlebury	W. S. Miller	3.29	12.22	0.79	3	18	65	27	26	11
Hazelbeach	Mrs. Albert Pell	2.75	10.84	0.47	5	17	68	28	82	10 & 11
Rockingham.Cstl.	H. Wate	2.45	9.42	0.45	5	14	73	28	26	6
Holdenby	Rev. F. C. Alderson ..	2.79	10.20	0.64	22	20	..	..	..	..
Kettering	C. W. Lane	2.82	9.71	0.44	5	19	68	28	29	13
Peterborough ..	J. Whitwell	1.80	7.68	0.40	22	13	75	27	32	7
Maxey Vicarage.	Rev. W. D. Sweeting ..	1.97	7.56	0.59	5	17	..	..	..	..
Av. 19 yrs 1866-84	H. Terry	1.66	8.62	..	..	..	..	..	..	..

JUNE.

Northampton ..	H. Terry	1.72	11.54	0.57	8	7	72	4	40	10
"	F. Law	1.89	11.59	0.68	8	8	87	4	38	11
Castle Ashby ..	R. G. Scriven	2.01	12.00	0.70	8	10	79	5	40	1 & 26
Litchborough ..	Ed. Grant	2.79	14.26	1.10	8	11	86	4	37	10
Sedgebrook	C. Markham	2.46	12.66	0.90	8	10	82	4	36	18
Rothwell	J. More, M.D.	2.54	11.38	0.99	8	11	..	..	..	..
Oundle	S. P. Holloway	2.40	10.55	1.46	8	8	..	..	..	..
Towcester	P. Phipps, M.P.	2.32	12.38	0.69	8	10	..	..	..	..
Little Houghton	J. Brawn	2.07	12.04	0.84	8	9	72	5	52	9
Fawsley	Lady Knightley	2.13	11.80	0.93	8	12	74	5	38	10
Thorpe Man'ville	Seth Baines	2.68	14.11	0.93	8	9	94	14	45	12
Twywell Rectory	Rev. H. Waller	2.60	10.69	1.41	8	..	..	..	..	..
Floore	E. G. Loder	2.13	12.63	0.75	8	5	82	4	37	1
Whittlebury	W. S. Miller	2.27	14.49	0.62	8	10	81	4	29	10
Hazelbeach	Mrs. Albert Pell	3.08	13.93	0.84	6	9	82	4	43	10
Rockingham.Cstl.	H. Wate	3.89	12.21	1.50	8	10	87	4	34	10
Holdenby	Rev. F. C. Alderson ..	2.61	12.81	0.85	8	10	..	..	..	..
Kettering	C. W. Lane	2.23	11.94	0.73	8	11	83	4	38	11
Peterborough ..	J. Whitwell	2.27	9.95	1.13	8	8	86	13	43	10 & 21
Maxey Vicarage.	Rev. W. D. Sweeting ..	2.80	9.86	1.02	8	8	..	..	..	..
Av. 19 yrs 1866-84	H. Terry	2.23	10.75	..	..	..	..	..	..	..

HENRY TERRY, SURGEON.

MEETINGS AND EXCURSIONS.

APRIL.

28th—Seventeen members were present. The Rev. G. B. Hooper read a paper on "The Astronomical Causes of the Glacial Period." The great fact that was taken into account was the difference in the distance of the earth from the sun when the former is in the aphelion of its orbit, and when it is in the perihelion, the difference amounting to more than fourteen millions of miles. But though the glacial epoch could not be brought about directly from the increase of eccentricity, it might however be occasioned from the physical agents produced by such eccentricity. As long as the eccentricity continued at a high rate, ice, etc., was transferred from one hemisphere to the other, and the condition of a hemisphere owing to the precision of the equinoxes was reversed every 10,500 years, thus inter-glacial periods were accounted for.

MAY.

19th—Seventeen members present. Mr. H. N. Dixon showed a Wild Tulip obtained by Sir Herewald Wake from Courteenhall. This is the first record of this plant in our county. Mr. J. Boddington exhibited specimens of the Copper Underwing feeding. Mr. H. N. Dixon read a paper on "Carniverous Plants." After stating that the great difficulty is exactly defining the true boundary between plants and animals, Mr. Dixon proceeded to describe some plants termed carniverous or insectivorous, from their feeding on animal matter through their leaves and not by means of their roots. The first plant described was the Round-leaved Sundew (*Drosera rotundifolia*), which has been met with in Northamptonshire; other plants described included Venus' Fly-trap (*Dionea muscipula*), which is also a member of the Sundew family, and is a native of North Carolina. The Pitcher plant of the genus *Nepenthis* were also noticed, as well as the Butterwort and Bladderworts, plants which possess the like property.

21st—At a sectional meeting of the Geological section, Mr. F. W. Rock was elected a member.

JUNE.

9th—Seven members present. Mr. H. N. Dixon presented the Society with a collection of 125 Northamptonshire Mosses. Mr. Loveday exhibited a number of plants from Jersey and Guernsey, among which were *Orchis laxiflora*, *Lotus Angustissimus*, *Matthiola sinuata*, etc. The following

mosses new to the county were shown by Mr. Dixon :—*Trichostoma tophaceum*, locality Wansford ; *Leptotrichum flexicaule*, Wittering.

22nd—Twelve members and friends were present. Mrs. Andfrew, Melbourne Crescent, and Mr. F. G. Wallis, of Kettering, were elected members. Mr. H. Fryer, of Chatteris, was elected a corresponding member. A fine specimen of *Pseudodiadema depressum* from the Lincolnshire Oolite of Wakerley was exhibited by Master F. Atkins. Mr. W. Law showed some botanical specimens collected on the Whit-Monday excursion. Mr. B. Thompson gave a description of an excursion with the Geologists' Association in the South of England. After explaining the route taken and the sections which were exhibited, some good specimens from the Oolitic and Lias Beds of Somersetshire were shown by Messrs. W. D. Crick and B. Thompson.

The weather of Whit-Monday was hardly sufficiently propitious to attract a large number to the excursion to Wansford and Bedford Purlieus, and the exclusively botanical section was represented by the proverbially sociable number of two. The rain however failed to damp the ardour of the party, which was rewarded by several interesting finds, though the season was too backward to admit of many rare plants being seen. Before reaching Wansford the rare *Hottonia palustris*, the water violet, was seen in dykes by the side of the railway, but so near the borderland that it was doubtful whether it could be claimed as a new locality for the county. In the limestone quarries at Wansford a new record for the moss-flora of the county was made in the shape of *Trichostomum tophaceum*, and another rare moss, *Tortula aloides*, was also found.

At Wansford the party divided, and the botanical section made the best of their way to Wittering Marsh. On the roadside several plants were noticed which pointed to the presence of a different soil from that around Northampton ; notably the rock rose (*Helianthemum vulgare*), *Poterium sanguisorba*, and *Avena pratensis*. A large patch of *Allium vineale* was noticed, in which all the leaves had their ends twisted into a spiral, cork-screw-like form. Some uncommon mosses were also found, especially *Leptotrichum flexicaule*, *Camptothecium lutescens*, and *Thuidium abietinum*, all new to the county, while *Fissidens adiantoides* and *Encalypta vulgaris* were growing very finely.

The marsh itself proved quite a field for exploration, though no new records of plants were made for it except that of *Carduus pratensis*, which was found growing profusely in one part of the bog, and *Hypnum commutatum* and *H. revolvens* in mosses ; but many of the still lingering bog plants of our county were seen, such as the bog bean (*Menyanthes*), the butterwort (*Pinguicula*), *Pedicularis palustris*, and *Schoenus nigricans*.

Leaving the marsh and making for Bedford Purlieus by the village of Wittering, the following plants were especially noticed :—*Silene puberula*, *Origanum vulgare*, and *Humulus lupulus*; and in a bog near to Bedford Purlieus were seen *Carex paniculata* and *Potentilla tormentilla*. Before reaching the woods the pretty little *Alchemilla vulgaris*, or Lady's Mantle was found, a rare plant in Northamptonshire. Owing to exigencies of time and weather, the woods were passed through as quickly as possible; many white-flowered plants of the Wild Hyacinth were seen, and also *Lithospermum officinale* and *Lysimachi nemorum*. Before reaching King's Cliffe, the appointed rendezvous of the different sections of the party, three rare plants were found, viz. :—*Hesperis matronalis*, *Malva moschata*, and *Verbascum nigrum*; and a few rare mosses were added to the day's finds, such as the beautiful little *Orthotrichum tenellum*, *Amblystegium irriguum*, in fine fruit, and a few sporangia of *Hypnum purum*, a plant which in the barren state is common, but of which the fruit is decidedly rare.

At King's Cliffe the geological members were met, and after tea the two parties journeyed home together.

JULY.

14th—Ten members present. A specimen of the Carpenter Bee (*Xylocopa caffra*) presented by Mr. Whitelaw, was exhibited in its burrow.





NORTHAMPTONSHIRE NATURAL HISTORY SOCIETY & FIELD CLUB.

No. 24. November, 1885.

THE MOLLUSCA OF NORTHAMPTONSHIRE AT THE BEGINNING OF THE EIGHTEENTH CENTURY.

IN view of the present working out of the molluscan fauna of the county of Northampton, it will be of considerable interest to reproduce the words of the Rev. John Morton, in the years 1706 and 1712, he being the first to observe with attention the mollusca of this county. The first extract is from the 25th. volume of the Philosophical Transactions of the Royal Society, for copying which the Society is indebted to the kindness of Mr. A. Loydell, of London. The second extract is from the Natural History of Northamptonshire, taken from the copy in the Natural History Society's Library by Mr. W. D. Crick. The extracts have been submitted to Messrs. Jno. W. Taylor and W. Denison Roebuck, by whom Morton's descriptions and figures have been carefully compared with those given in Martin Lister's works, which were Mr. Morton's text-books. It is of course obvious that the determination of what species were intended by these old authors cannot always be made with complete certainty, but in doing this regard has been had to the fact that it is the most commonly occurring or the most striking and obvious species that have first come under their notice. The extracts are copied exactly from the books referred to, all other remarks and explanations being enclosed in square brackets [].

A.D. 1706.

[Extract from the Philosophical Transactions, vol. xxv., No. 305, p. 2210.]

"A LETTER from the Reverend Mr. Morton, A.M. and S.R.S. to Dr. Hans Sloane, S.R. Secr. Containing a Relation of River and other Shells digg'd up, together with various Vegetable Bodies in a Bituminous Marshy Earth, near Mears Ashby in Northamptonshire: With some Reflections thereupon. As also an Account of the Progress he has made in the Natural History of Northamptonshire."

"In obedience to your commands, I send you the Account of the Land, and River Shells lately discover'd by the Worthy and Inquisitive Mr. Coxo

of Mears-Ashby Northamptonshire, in a Moorish Pasture in Mears Ashby field. I visited the place my-self, he very generously attending and assisting me. I know the Relation will be the more acceptable to you, and 'tis indeed of greater Regard, because Land and River Shells are so very rarely met with in Digging into the Earth, in comparison of sea shells, and the Teeth and Bones of Marine Animals; which indeed occur almost everywhere and in all Countries. The Reason of which is now no longer a Difficulty, these Bodies having been shown to be all Remains of the Universal Deluge; and the Marine Shells being more ponderous than those of the Land and Rivers sunk and were lodg'd deeper in the Earth, and so were preserv'd by that means; whereas the later being left generally upon the Surface perish'd, and are at this day rarely met with.

Causing one to dig into the Moorish ground above mentioned, we found a small number of Snail Shells of various kinds buried there, At about a foot in depth they lay very thick; and sinking still downwards the number rather increased till we came to the depth of about three foot. 'Twas troublesome to sink deeper on purpose; but we made Tryals for a considerable extent of ground, viz. about 250 foot in length, and 130 in breadth. Besides, the same Shells were cast up in several places, at distance, by moles. What we principally observed in this search was 1. A moist Moorish black earth, in some places a foot and a half, in others somewhat about two foot in thickness. The lower half of it is blacker and denser than the upper half, of a Bituminous Nature, and has all the characteristics of Peat-earth. Besides shells we found Stalks and Leaves of Grass, and also of many Kinds of other Vegetables repositied as usual in like Bituminous Moors, in other parts of the island. 2. White Earth; so at first we called it: But upon closer Inspection it appear'd to be little more than Hay half wasted. So deep as we sunk into it, we found it everywhere copiously interspers'd with Shells.

The finding these Shells Under Ground made it very reasonable to enquire whether there were any of the like at this time living upon the surface. I diligently search'd this place, but cou'd not meet with any Live ones of any Kind whatever there.

The Fossil Shells were some the Exuviae of Land Snails, the rest of River or Fresh Water Snails: Of the former there were the 3 following kinds. 1. A small Buccinum of 5 wreaths, the *Buccinum exiguum quinque anfractum*. Tit. 7. List. in Tractat. de Cochleis Terrestr. Angl. A Kind observ'd by Dr. Lister to live in moss upon old Garden Walls at Estrope in Lincolnshire; by my-self at the Mossy Roots of Old Trees in many of the Northamptonshire Woods, as also amongst Moss upon the Boggy sides of several standing Springs. [The '*Buccinum exiguum quinque anfractum* Tit. 7, Lister' &c. is *Cochlicopa lubrica*, as Morton's shell evidently is also. But Morton is wrong in attributing Lister's locality 'Estrope' to it, as this

applies to *Pupa umbilicata*, Lister's Tit. 6]. 2. A Cochlea of the compressed kind, but not so much compressed as some of them are. It has 5 Wreaths and a small circular Sinus in the Center. This, if it is not the Cochlea umbilicata &c. N. 79. List. Hist. Conchyl. Lib I. has not hitherto been mention'd by any Writer; tho' common enough in the Woods in Northamptonshire: I found a greater Number of them, for the Compass of Ground inclos'd in the earth, than ever I have done in any of the places where they naturally breed. [Evidently *Helix rotundata*].

3. The Cochlea citrina Tit. 3. List. de. Cochl. Terrest. Ang. The Common strip'd snail-shell. But most of these in the Moor are White, of the Colour of the shells that have been a long time dead. In some I saw faint footsteps of their former Stripes. Most of the Shells of this Kind were lodg'd about 4 foot deep. [*Helix nemoralis* or *H. hortensis*, or both].

We met with only two different Kinds of River Shells 1. A Perewinkle Shell of 3 Wreaths, generally less than the Buccinum trium Spirar. Tit. 24 List de Cochleis. Fluviatil. Ang. There were a greater Number of these buried in the Moor than any of the former Kinds [*Succinea putris*]. 2. A perewinkle Shell of 5 Wreaths, much smaller and more prominent than those of the Buccinum longum sex Spirarum Tit. 21, List. de Coch. Fluviat. 'Tis otherwise very like that Buccinum in the fashion of its Wreaths. It has not yet been describ'd by any Author. We find the Kind now living in one of the Northamptonshire Brooks called the Isc. [Most likely to be *Limnæa peregra*].

The Moorish Ground wherein these Shells were buried extends from near the top to very near the foot of a small Hill. Above the Moor, upon the Top, and at the Brow of the Hill, is a Sandy Soil of a Reddish Colour. The whole face of the Moor is plain and even, conformable to the rest of the Hill not thus Moory of the same Declination with it; and appears to be in a Natural, and Undisturbed state, as much so, as any of the Slades in the Neighbouring Fields; excepting that 3 or 4 Trenches have been cut through it of late.

'Tis evident that these Shells were left at the Deluge, when those from Sea were also repositd at Land; and not buried since by Deterrations from the Ground above. For then the upper parts of the Moor must have been cover'd with a Reddish Sand, such as the Ground is for the main composed of; but nothing like that appears near the Shells in this Moor. Besides, here are dug up several Shells that in all likelihood never bred here, but are Inhabitants of a different Soil: Particularly the striped Snail-Shell. For these Animals have peculiar Soils and affect particular Regions. But what I here give only brief hints of, will appear in a much better light when rank'd amongst other like Relations, in the Natural History of Northamptonshire. [The foregoing is inserted in the Natural History of Northamptonshire, nearly verbatim, pages 254 and 255].

You are very Kind in your Enquiries about the Progress of that Work; and very many of my Friends in this Country have been pressing in their Sollicitations to have it at an end. I am mighty sensible of their Good Wishes both to me, and to that Undertaking; and hope all here are now well satisfied it goes on as fast as is practicable. I have indeed exceeded the time I at first proposed; but this is owing to the Growing of Materials upon my Hands, and the Difficulty of treating of them in a manner that was fit, and would render the Design useful. Those who have well weigh'd this, leave me very frankly to my own Time: And I will do my best to acquit myself of the Task with such Dispatch, that they shall have no Cause to think their Indulgence and Generosity misplaced. I have gone through the several Heads of the Heavens and Air, the Waters, the Earths, the Stones, the Sea Shells and other Marine Bodies found at Land; and am now upon that of the Plants; haveing only that of the Brute Animals, that of the Humane Bodies, and that of the Arts to finish. Now as to this, at the same time that I will have more Regard to the Performing it in such a manner, as to render the Design Useful, than to the hurrying it to an End; and you and the rest of my Friends may depend upon't, that I will not loose one single Hour that I can spare from the Exigences of my other Affairs, till I have accomplished the whole

I am Sir

Yours &c

J. MORTON.

A.D. 1712.

[Extract from] The Natural History of Northamptonshire; with some Account of the Antiquities. To which is annex'd a Transcript of *Doomsday-Book*, so far as it relates to That County, By *John Morton*, M.A. Rector of *Oxendon* in the same County and Fellow of the Royal Society: Formerly of *Emanuel-College* in *Cambridge*. London MDCCXII.

Page 414.

CHAP. VII. OF BRUTE ANIMALS.

14. "I therefore proceed to the *Exanguia Apoda*, and having nothing very remarkable concerning the Naked *Apoda*, which are usually called *Limaces*, the Naked Snails, whereof we find no other here than the Three common Sorts described by Dr. *Lister* ||, [*Limax maximus*. *Limax agrestis*. *Arion ater*].

|| Vid Dr.
Lister's
Tract De
Cochl.
Ter.
Angl.

I go on next way to the *Testaceous* ones, the Footless Exanguious Creatures that are cover'd with Shells; of which we have indeed a great Variety both of the *Land* and *Water Sorts*.

15. All the Fourteen Sorts *Cochlæ Terrestres*, or *Land-Shell Snails*, described by the Ingenious Dr. *Lister*, in his Tract *De Cochleis Angliæ Terrestribus*, we have here; excepting only the First, the *Cochlea maxima cinerea operculo gypseo*, &c. the great Edible lidded Snail [*Helix pomatia*], and perhaps that *Tit. 11. ibid* [*Balea perversa*]. The Great Edible Snail, tho' common in some Places in the *Southern Parts of England*, yet can scarce be brought to live with us; as appears by an Experiment made by the late Lord *Hatton* who put a great many live ones of this Kind into a convenient Coppice near his House at *Kirby*, with Intentions that they should breed there; but in a short time they all dy'd. Neither have I yet met with the *Buccinum*, *Tit. 11. List.* [*Balea perversa*] but the rest of them are obvious enough, even those that seem to be very rare by Dr. *Lister's* Account of them.

16. To gratify those who are Curious in the History of these Elegant little Creatures, I shall here direct to some of the Places in this County, where the choicer and rarer Animals of this Kind are the most frequent and numerous.

The *Cochlea cinerea striata*, &c. *Tit. 5. Dr. Lister**, or the Striated Lidded Shell-Snail is not a very common one here; but yet under the Bushes by an old Stone-pit on the *South Side of Wakerly Church*; and also under the Bushes upon a very steep Place of the *South Bank of the Weland* in *Wakerly Lordship*, there are many of them. [*Cyclostoma elegans*].

**Cochlea terrestris turbinata & striata* Fab. Column. De Purpura.

The *Buccinum exiguum mucrone obtuso*, &c. *Tit. 6. Lister*, I have found in great Plenty in a Ground nigh *Morsley Wood*, especially upon a Stone-Heap there. [*Pupa umbilicata*].

The *Buccinum exiguum quinque spirarum mucrone acuto*, *Tit. 7. List.*, occurs very frequently in all our moister Woods, in the Moss at the Roots of the old Trees; as also among the Moss and Sedge upon the Boggy Sides of several standing Springs, as at *Oxendon* and *Arthingworth*. [*Cochlicopa lubrica*].

The *Buccinum Rupinum majusculum circiter sex orbibus circumvolut*, *Tit. 8. List.*, we find with the former in the same Woods, but much more rarely. [The extreme brevity of *Lister's* description of this and the pooriness of his figure render its identification very uncertain; but *Azeca tridens* appears to be intended].

† De
Coch.
Ter.
Angl.
Tab. 1.
Fig. 7.
in Ap-
pend. ad
Geodart.

The *Buccinum pullum ore compresso circiter decem spirarum*, Tit. 10. List.† in the Woods at *Cliff*, and in many others : Likewise a larger Variety of them, tho' more rarely, in the same Woods. [The Tit. 10 is *Clausilia rugosa*; and it is likely that the 'larger Variety' is *C. laminata*.]

This, and the *Buccinum exiguum quinque spirarum*, List. [*Cochlicopa lubrica*] are with us, of all the Species of these pretty small Perewinkles, the commonest.

The *Buccinum parvum sive Trochilus silvaticus*, Tit. 9. List. we find, if I mistake not, in *Morsley* Wood ; but 'tis extremely rare. The Shell I have from *Morsley*, agrees in all Regards with the above-named of Dr. *Lister* ; but that the Doctor's has (as he says) Six or Seven Circles or Wreaths, this no more than Five at the most, and the live Shell is all over a little brisly. [Lister's shell is *Zonites fulvus* ; Morton's is *Helix aculeata*].

||Cochlea
subfus-
ca, um-
bilicata,
clavicula
modice
producta
List.
Conchyl.

The *Cochlea dilutè rubescens sinu ad umbilicum exiguo circumdato* Tit. 12. List. || we meet with also at *Morsley*, and in other of the *Northamptonshire* Woods. [*H. rufescens*].

Lastly, The *Cochlea pulla silvatica spiris in aciem depressis*, Tit. 14. List. in Hedge-Bottoms on the *West Side of Oakly parva*, by the Road to *Stanian*. [*Helix lapicida*]

17. Besides these already described by Dr. *Lister*, we have here no fewer than Six Sorts of Land Snails, that, I think, are wholly new and undescribed.

* Tab. 31.
Fig. 1.

First, The *Buccinum heterostrophum minutum fuscus sex spirarum ore subrotundo* ; * so we may entitle a small Brown *Buccinum* or Perewinkle, with a roundish Mouth of Six Wreaths, which are convoluted from the Right hand to the Left ; whereas almost all other Shells, whether of the Land or Sea, have a quite different Turn, viz. from the Left Hand to the Right, therein observing, as it were, the Sun's Motion on this *North Side of the Æquator*. For which Reason this Shell has the Adjunct of *Heterostrophum* in the Title. 'Tis less than the *Buccinum terrestre*, Tit. 11. List. Neither is there drawn around the Middle of its Basis or First Wreath, a sharp Ridge, as is in that. I first found it in 1695, in a Wood that had been new cut down at *Morsley* : and since not unfrequently in the Thicker Parts of the Neighbouring Woods amongst Moss. [We think Morton here misconceives Lister's observations—Morton's shell is *Balea perversa*, and what he takes to be Lister's are probably young *Clausilicæ*].

Secondly, *Trochilus exiguus 4 spirarum elegantissime striatus*. Tis a very small Shell, scarce the Fourth Part of a Barley Corn in

Bigness, the Colour a lighter Brown, of the *Trochus* Shape, having Four Wreaths fashioned, as those of the *Trochi marini*, with a pretty flat Basis. 'Tis very neatly streaked or striated with deep *Striæ* transversely to the Turn of the Wreaths. The larger Wreaths rise up into a sharpish Ridge. I found it in the Clefts of a Sallow-Root, in a Thicket of Sallows near a Pond of Mr. Chamberlain's, in *Thorpemandeville* Lordship. [Extremely difficult to identify; it may possibly be *Helix pygmæa*, but is more likely to be young *H. rotundata*].

Thirdly, *Cochlea é Compressis, coloris subfusci, clavicula productiore 5 spirarum, ex altera parte umbilicata, & subtiliter echinata.*: A *Cochlea* or Snail-shell of the compressed Sort, of a Brownish Hue, with Five pretty much exerted Wreaths, a Circular *Sinus* in the Center on one Side of it, and beset all over with short and stiff little Hairs or Bristles. 'Tis not unfrequent in our Woods, particularly in those about *King's-Cliff*. Perhaps it is the *Cochlea subfusca claviculæ modicè productæ*, *List. Hist. Conchyl. N. 79. L. 1.* [*H. hispida*].

Fourthly, *Cochlea pellucida subflavia quinque spirarum, magis compressa, umbilicata*: A Pellucid Yellowish Wood *Cochlea* of Five Wreaths, more compress'd than the former, but with such a *Sinus* or *Umbilicus*, as that has. Its Yellowish Colour, as the Snail decays and dies, goes off, and it fades by Degrees to a White: as it is with all other the like colour'd Shells, both of the Land and Rivers. [This is a species of *Zonites*, probably *Z. cellarius* or *Z. nitidulus*, but it is impossible to determine the species with precision].

Fifthly, *Cochlea parva magis compressa umbilicata quinque spirarum, pullo & subflavo colore eleganter tessellata, striis capillaribus transversè depicta*: A *Cochlea* of the more compressed Sort, umbilicated, and Five-wreath'd, as the former; but differing from that, and all the rest of them, observably in the Two following Marks. [*H. rotundata*].

1. In that 'tis beautifully checquer'd with Yellow and Brown.

2. In that 'tis striated transversely with Hair-like *Striæ* very close set. We find it in a little Wood call'd *Loteland*, nigh *Harrington*, amongst the Moss at the Roots of the Ashes and Oaks, and in many other of our Woods.

Sixthly, *Cochlea compressa umbilicata minima trium spirarum ore rotundo reflexo*: A compressed umbilicated *Cochlea*, the smallest of all the Kind, of only Three Wreaths, with a round Aperture whose Margin is bended a little backward. I have found it in Boggy Places in *Oxendon* and *Arthingworth* Fields in great Plenty. [*H. pulchella*].

18. Of the *Cochleæ fluviatiles*, by which we mean the Fresh Water Snails, together with the *Patella*, and the Fresh Water Bivalves, which Dr. *Lister* treats of in the same Books, there are in all Eighteen Sorts ; every one of which we have here, excepting only the *Nerita Fluviatilis*, Tit. 20. *List. de Coch. Angl.* [*Neritina fluviatilis*]. The *Musculus Niger omnium crassissima & ponderosissima Testa* Tit. 31. [*Unio margaritiferus*]. *Append ad Goedart*. And perhaps the *Musculus omnium augustissimus*, Tit. 33, *Ibid.* [A small form of *Unio pictorum*].

In my Account of the *Cochleæ fluviatiles*, I shall observe the same Method as I did in the former Article of the *Cochleæ Terrestres* ; First acquainting the curious Reader where the more rare Sorts of those already described are to be found with us : and to these annexing a short Description of the hitherto undescribed ones of this Kind, which this County affords.

The more rare Species of them, according to Dr. *Lister*, are I think these that follow.

The *Cochlea fusca fuscata vivipara*, Tit. 18. *List.* This sort we find in the *Weland* and other of our Rivers, as also in the Fen-Ditches. [*Paludina contecta*.]

The *Buccinum 6 spirarum ore augustiore*, Tit. 22. *List.* In the *Ise* below *Arthingworth*, and in the Fen-Ditches nigh Sir *John Shaw's* Decoy. [*Limnæa peregra*].

Buccinum trium spirarum, Tit. 24. *List.* In our larger and older Pools in Plenty : as also in the Boggs in the Clayland. But these last are for the most part much smaller than those of the Dr.'s ; so that I suspect them to be of a different Species. [*Succinea putris*].

Buccinum trium spirarum à sinistra in dextram convolut. Tit. 25. *List.* [*Physa fontinalis*]. *Buccinum fluviatile a dextra sinistorsum tortile trium orbium sive Neritodes* *List. Hist. Conchyl. Lib. 2. N. 34.* [Might possibly be a *Succinea*]. I have never met with them here but in some few of our Fen-Ditches, and in that part of the *Ise* betwixt *Arthingworth* and *Newbottle* Bridge.

The *Cochlea compressa, sine limbo 5 spirarum*, Tit. 28. *List.* In the *Ise* and other of our Brooks, as also in the Fens. [*Planorbis spirorbis*].

The *Patella fluviatilis*, Tit. 32. *List.* Which is a very rare Animal in most Parts of *England* ; Yet I found a great Number of them affix'd to loose Stones lying in the Water underneath a small Bridge in the Lane that leads up to *Dean* from *Dean-Thorp*. [*Ancylus fluviatilis*].

The *Musculus exiguus*, *piri magnitudine rotundus*, &c. Tit. 31. *List. Ibid. Pectunculus globosus* N. 14. *List. Hist. Conchyl.* in Sect. 3. *de Bivalv. fluviatil.* The small globous River Cockle. It occurs very frequently in our Ponds and Brooks. [*Sphærium corneum*].

Musculus latus, *maximus*, *testa admodum tenui*, *ex fusco viridescens*, *palustris*, *List. Append. ad Goedart.* p. 9. *Musculus latus maximus & tenuissimus è cœruleo viridescens fere palustris* *List. Hist. Conchyl.* Lib. 2. N. 11. We have it in some of our old Ponds, as in those of Sir John Langham's at Cosbrook. [*Anodonta cygnea*].

The *Musculus tenuis minor latiusculus*, Tit. 30. *List. Append. ad Goedart.* *Musculus tenuis minor*, *subfuscus latiusculus*, *List. Hist. Conchyl.* Lib. 1. N. 8. In the *Ise*, the *Nyne*, and indeed all our other Rivers. [*Anodonta anatina*].

The *Musculus angustior*, &c. Tit. 30. *List. de Coch. Angl.* We find in the River *Nyne* near the Influx of the *Ise*. Dr. *Lister* acquaints us that he has sometimes met with a great number of *Pearls* in this sort of Muscle. *Vid. Append. ad Goedart.* p. 18. [*Unio pictorum*].

19. I am now to add to the *English Cochleæ fluviatiles* of Dr. *Lister*, the undescribed Sorts that I have found in *Northamptonshire*. They are these that follow.

First, The *Buccinum subflavum pellucidum quatuor spirarum testæ Aperturâ parva, ad sinistram partem reflexâ*. It agrees very nearly with the *Buccinum subflatum fluviatile*, Tit. 3. *Hist. De Coch. fluvi. Angl.* in Size; But this has Four Wreaths, whereas that has only Three: This also has a smaller Aperture, which is bowed a little outwards on the Left Side: its Wreaths are rounder and somewhat more tumid: and it is a firmer Shell. In all these Particulars, it differs from the above-named *Buccinum* of Dr. *Lister*. We find it in the Boggs and Brooks, as at *Arthingworth*: and 'tis no uncommon Shell. [Probably a form of *L. peregra*].

Secondly, *Buccinum 5 spirarum pellucidum subflavum*. This is one of the slenderer and larger Sorts. In the manner of the convolution of its Wreaths, 'tis much like the *Buccinum minus 6 spirarum*, Tit. 22. *List.* But 'tis smaller by more than one half, and its Wreaths are somewhat more Prominent or Tumid. 'Tis found together with the former, and is almost as common. [*Limnæa truncatula*].

Thirdly, *Buccinum 6 spirarum heterostrophum pellucidum flavum*.* This also is one of the slenderer and longer sorts of *Buccina*. As to size, 'tis somewhat less than the *Buccinum fluvi.* Tit. 22. *List.* and has a narrower Mouth. 'Tis a very slender Shell,

*Tab. 12.
Fig 2.

of a *Yellow* Colour: but what abundantly distinguishes it from all the rest of the longer shap'd River Perewinkles is, its Wreaths are convoluted from the Right Hand to the Left, in the wry uncommon Way. I first found it in some Ditches nigh Great *Bowdon* in *Leicestershire*, and since that as I remember in *Burrow-Fen*. [*Physa hypnorum*].

Fourthly, *Pectunculus fluviatilis exiguus, figuræ subsphericæ compressæ*. 'Tis of several Sizes, from that of a *Lettice* to that of *Hempseed*. Towards the Rim it has a few small *Rugæ*. The colour of the fresher Shells is a Bluish White, or inclines a little to a Yellow: 'tis a thin and slender shell: both Valves very much alike. There are plenty of them in the Boggs in *Arthingworth* and *Oxendon* Fields. Also in the *Ice*, and I suppose in other of our Rivulets." [*Pisidium*].

[IT is to be observed in respect of the two figures given in Morton that they are both reversed, which fact caused temporary hesitation in giving names to the species figured. But on referring to Lister's figures, we find they are all reversed in like manner; from which it would seem that the engraver portrayed them on the copper plate as he saw them, and that the act of printing reversed all the figures.]

ENTOMOLOGICAL NOTE.

ON September 5th, and during the following week, I was fortunate enough to capture eight *Sphinx Convolvuli*, in a garden at the outskirts of the town. I took them on a bed of the tobacco plant, the flowers of which seemed exceedingly attractive to the moths.

Mr. W. Hull, to whom I mentioned the locality, also took two specimens.

F. BOSTOCK, JUN.

P.S.—I shall be pleased to show my specimens to any member of the Society who may be interested.

FLOWERS.

BY SIR HEREWALD WAKE, V.P.

FLOWERS: who dare confess that he is not fond of flowers? Pity the man, deeply pity the woman, who does not love them. Man or woman may live far removed from flowers—their dwelling places bricks and mortar, their associates hearts of stone; life for them may be hard, dry, mechanical, and monotonous, but that in their nature, which is in sympathy with flowers, alone enables them to survive the blighting influence of their surroundings.

A man who cares not for flowers must have done with all the illusions and fancies of youth, must be utilitarian in the extremest degree, and above all must be a real materialist at heart, not one of those who so dub themselves out of sheer conceit, and who imagine by adopting soulless theories they can arrogate to themselves the possession of a superior intelligence, but one of those, if such can exist, who, believing they have no hereafter, must have stifled the grandest and noblest instinct common to the human race until his heart is given over to despair.

Let us take a bunch of flowers and see what philosophical and scientific lessons it can teach us.

In connection with moral and religious lessons, the theme is trite if beautiful, but without appealing to authority which scoffers deny, without touching on revelation, which as divine truths materialists ridicule, let us, as natural philosophers and as scientists, see how far the existence, the form, the colours, and the scent of flowers go far to prove, in the first instance, that man has a soul, and, if so, that necessarily there must be a God, Creator, and supreme judge of the universe.

We must for the sake of our argument, and the more easily to refute them, adopt the theories of those who style themselves the advanced thinkers of the age. We must for the nonce give in our unreserved adhesion to the theory of evolution, so far as it applies to the vegetable kingdom.

Flowers, then, are the outcome of the necessities of vegetable existence, the means whereby certain vegetables find it possible to propagate their kind and the forms they adopt are adapted to their surroundings, and are varied by the various circumstances connected with their environment. Originally the spontaneous development of a vegetable germ, they now clothe the earth with beauty and verdure, from mountain crest to deep sea cavern, through the agencies of the grand law of nature, discovered by philosophers and naturalists embodied in the word evolution.

Stay, the spontaneity of animal life is utterly denied, and with good reason, by the very professors who maintain that there is nothing true that the human intellect can not grasp and fathom. So it is with vegetable life, and it is as great a puzzle still, as ever, the theory of evolution accepted, *what gave rise to life at all?* Animal or vegetable? Why is it we see this great question invariably shirked by those who, from the plausible and convincing arguments of great naturalists, formed theories upon them, and from the basis of such theories deduce that the whole material world was self-created by the self-made laws, mark you, of nature, and that, therefore, man is a mere fortuitous circumstance, and that the existence of his soul is a fiction?

But life is true if anything is true, flowers exist if anything exists; is it because we have inferior intellects that we are tempted to inquire of the materialistic school, before we put blind faith in their dogmas, how they account for the origin of all things? Surely theories built up on no basis whatever, are very castles in the air. Still, we have now taken lodgings in these castles, so let us look out of the windows and see what we shall see.

Clever fellows these flowers; how they have decked their dainty forms in gorgeous colours! Borrowed from the rays of the sun, professor, eh? But what rainbow can compare in depth and variety of shade with my garden border? The light of the sun is divisible into seven lights of different colours, combine them as we may, we shall not produce anything half so brilliant as the hue of yon single dahlia's petals.

Heat and light, acting on the mineral ingredients absorbed by the plant, nature's laboratory, the hues of polarized light, and all the rest of it, yes! yes! yes! but why? Why are some lilies white, and some yellow, and some red, under the same conditions, growing in the same place? On what possible utilitarian or material grounds can you account for the presence of beauty in inanimate forms?

With your microscope and your profound knowledge of chemistry, by putting two and two together you may imagine you have discovered in some particular instance exactly how its done; you may draw up an exact list of the causes which have produced a certain result, but in your loftiest moments of self worship you cannot for the life of you say, Why this result was achieved; if man has not a soul, and you say he has not, can you tell me the use of a flower's beauty?

Can you give me a reason, not how flowers contrive to be so varied and excellent in their colour, but why?

If all flowers were of one colour and of one shade, would they be less prolific or of less use in the mere reproductive sense? But answer me this: How do flowers speak to us? Is it not by the purity and innocence of their forms? Children and true poets are most in sympathy with flowers for this reason. What do flowers speak to in us? How is it that in common with

sweet music they raise indefinable emotions of pleasure in our breasts? If man is a mere animal with a superior intelligence, why should he take any more pleasure in a flower than a dog or a horse, etc., who are creatures with no little intelligence?

We talk of the senses of hearing and of seeing, is therefore that which so pleases the eye and the ear a mere minister to our sensual pleasures? Are these sensual pleasures shared in common with all other creatures that have eyes and ears, or is it that through the eyes and through the ears, there is something within us which enables us to derive a nobler and more intense pleasure than the lower animals who gaze on these flowers without any higher emotions than they would gaze on dull stones?

There are exceptions among the lower animals—the bower birds who pluck the flowers, the snakes and frogs who are affected by music, and so on; but that only proves that flowers and music possess extraordinary powers; they are exceptions that prove the rule that the lower animals are dead to any elevating influences they possess. It cannot be our intellects that are inspired with pleasurable emotions. The brain, when hard worked, would be but harder worked if it was exercised by the mere contemplation of the beautiful. What tired brain worker does not find himself refreshed and rested by devoting a few leisure moments to the admiration of beautiful flowers? Is not that admiration always accompanied by involuntary wonder? Is there not a mystery in their beauty? Oh, my philosopher, you who cannot say why these things are, you must confess that even to your precise and mathematical intelligence, when you contemplate a flower, that there is something left in this world which even your master mind can not altogether comprehend, and which you never will comprehend unless you believe in the existence of your soul, which is holding converse with the flowers whom the loving God has placed before you, to speak to you silently, tenderly, and lovingly of the great mysteries which you shall never fathom until your erring intellect has humbled itself in the dust before Him.



METEOROLOGICAL REPORT AND OBSERVATIONS, 1885.

JULY.

THE special feature in connection with the weather this month was its extreme dryness ; some few days were characterised by very high temperatures, accompanied by bright sunshine, but at the other times cool spells were experienced ; the weather, however, was for the most part seasonable and beneficial for all agricultural purposes. Rain fell on four days only during the month to the depth of 0·24 of an inch, or 2·76 inches below the average of the last 16 years. The mean temperature, 63°, was about the average, the maximum thermometer varied from 80° degrees on the 26th to 66° on the 29th and 30th. The variations of the minimum thermometer were from 42° on the 1st to 61° on the 27th. The barometer was very steady during the whole of the month, varying only from 29·70 inches on the 19th to 30·25 inches on the 22nd. The wind was S.W. to N.W. until the 20th, then easterly to the end of the month.

AUGUST.

August was fairly warm and dry, with a fair amount of sunshine, the temperature being about 4° below the average. A heavy thunderstorm passed over this district on the 5th, the rainfall varying considerably in different parts ; at Northampton we had a great deal of thunder and lightning and only 0·31 of an inch of rain, whilst at Castle Ashby 1·99 inch of rain fell in two hours, but very little thunder and lightning. Another storm followed next day, with great variations in the rainfall, the heaviest falls taking place in the eastern part of the county. Rain fell on 10 days to the depth of 2·09 inches, or ·02 above the average of the last 16 years. The mean temperature, 58°, was about 4° below the average ; the maximum thermometer varied from 77° on the 16th to 55° on the 27th ; the minimum thermometer varied from 42° on the 14th to 58° on the 10th and 13th. The variations of the barometer were from 29·40 inches on the 10th to 30·15 inches on the 15th.

SEPTEMBER.

The dry weather, which was so conspicuous a feature in July and part of August, had quite disappeared at the commencement of this month, and weather of a very unsettled character set in, of the first 20 days rain fell on 17. The temperature was low, being about 1° below the average. The wind was generally westerly N.W. to S.S.W., with a slight touch of east. Rain fell on 21 days to the depth of 3·75 inches or 0·83 of an inch above the average of the last 16 years, the greatest fall 1·52 inch occurring on the 10th. The maximum thermometer varied from 74° on the 15th to 50° on the 27th ; the variations of the maximum thermometer were from 59° on the 15th to 32° on the 28th. The barometer varied from 30·12 inches on the 22nd to 29·40 inches on the 30th.

FRANK LAW.

1, Agnes Road, Northampton.

JULY, 1885.

STATION.	OBSERVER.	RAINFALL.				SHADE TEMPERATURE.			
		Total for Month.	Total for Year.	Greatest Fall.	Wet Days.	Maximum.		Minimum.	
						Deg.	Date.	Deg.	Date.
Northampton ..	H. Terry	0.84	11.88	0.12	12	4	..	..	..
"	F. Law	0.24	11.83	0.14	19	4	89	26	42
Castle Ashby ..	R. G. Scriven	0.19	12.19	0.08	18	4	89	25	48
Litchborough ..	Ed. Grant	0.40	14.66	0.27	18	4	95	25	45
Sedgebrook	C. Markham	0.15	12.81	0.13	19	2	81	25	39
Rothwell	J. More, M.D.	0.24	11.62	0.10	19	5	..	..	..
Oundle	S. P. Holloway	0.47	11.20	0.17	12	7	..	..	..
Towcester	P. Phipps	0.25	12.63	0.12	18	6	..	..	..
Little Houghton ..	J. Brawn	0.75	12.79	0.61	12	4	..	..	..
Fawsley	Lady Knightley	0.16	11.96	0.07	18	4	79	26	46
Thorpe Man'ville ..	Seth Baines	0.16	14.27	0.18	18	2	93	10	49
Twywell Rectory ..	Rev. H. Waller	0.43	11.12	0.29	13	3	..	..	..
Floore	E. G. Loder	0.35	12.98	0.22	18	2	86	25	35
Whittlebury	W. S. Miller	0.29	14.78	0.20	18	5	86	25	38
Hazelbeach	Mrs. Albert Pell	0.21	14.14	0.10	19	3	89	26	48
Rothinghm. Oastl.	H. Wate	0.50	13.31	0.27	25	2	96	26	43
Holdenby	Rev. F. C. Alderson ..	0.16	12.97	0.09	19	2	..	..	..
Kettering	C. W. Lane	0.40	12.34	0.23	12	5	88	25	44
Peterborough	J. Whitwell	1.36	11.31	1.04	12	4	91	25	42
Mazez Vicarage ..	Rev. W. D. Sweeting ..	0.67	10.53	0.35	12	7	..	..	..
Av. 19 yrs 1866-84	H. Terry	2.83	13.95	..	..	..	..	..	..

AUGUST.

Northampton ..	H. Terry	2.19	14.07	0.51	21	10	..	..	..
"	F. Law	2.09	13.92	0.84	21	10	77	16	42
Castle Ashby ..	R. G. Scriven	4.63	16.82	1.99	5	12	76	15	39
Litchborough ..	Ed. Grant	2.07	16.73	0.48	21	13	81	16	40
Sedgebrook	C. Markham	2.77	15.58	0.72	5	12	74	16	38
Rothwell	J. More, M.D.	3.02	14.64	1.05	6	14	..	..	..
Oundle	S. P. Holloway	3.01	14.12	0.95	6	11	..	..	..
Towcester	P. Phipps	2.18	14.81	0.47	27	11	..	..	..
Little Houghton ..	J. Brawn	2.86	15.65	0.70	5	11	65	15	43
Fawsley	Lady Knightley	2.56	14.52	0.43	28	14	68	17	40
Thorpe Man'ville ..	Seth Baines	2.92	17.19	0.84	27	14	73	8	35
Twywell Rectory ..	Rev. H. Waller	2.63	13.75	0.64	6	..	..	..	..
Floore	E. G. Loder	2.54	15.52	0.47	4	11	72	10	36
Whittlebury	W. S. Miller	2.37	17.15	0.43	21	11	74	11	32
Hazelbeach	Mrs. Albert Pell	2.74	16.88	0.51	21	12	73	16	43
Rothinghm. Oastl.	H. Wate	2.89	16.20	0.64	27	10	81	16	36
Holdenby	Rev. F. C. Alderson ..	3.06	16.63	0.61	5	14	..	..	..
Kettering	C. W. Lane	4.05	16.89	1.04	6	14	74	16	41
Peterborough	J. Whitwell	2.43	13.79	0.53	5	8	75	16 & 17	38
Mazez Vicarage ..	Rev. W. D. Sweeting ..	2.92	12.45	0.86	7	11	..	..	..
Av. 19 yrs 1866-84	H. Terry	2.31	16.28	..	..	..	..	..	..

SEPTEMBER.

Northampton ..	H. Terry	3.65	17.72	1.52	10	17	..	..	..
"	F. Law	3.75	17.67	1.52	10	21	74	15	32
Castle Ashby ..	R. G. Scriven	4.21	21.03	1.37	10	22	75	15	31
Litchborough ..	Ed. Grant	4.57	21.30	1.47	10	21	74	15	30
Sedgebrook	C. Markham	3.71	19.29	1.33	10	20	73	15	31
Rothwell	J. More, M.D.	3.27	17.91	0.95	10	22	..	..	..
Oundle	S. P. Holloway	2.93	17.05	0.81	10	21	..	..	..
Towcester	P. Phipps	3.78	18.59	1.32	10	20	..	..	..
Little Houghton ..	J. Brawn	3.64	19.29	1.46	10	20	63	15	39
Fawsley	Lady Knightley	3.69	18.21	1.19	10	22	68	15	31
Thorpe Man'ville ..	Seth Baines	3.90	21.09	1.16	10	16	68	9	30
Twywell Rectory ..	Rev. H. Waller	3.09	16.84	1.01	10	..	..	..	..
Floore	E. G. Loder	3.84	19.36	1.24	16	17	74	15	30
Whittlebury	W. S. Miller	4.35	21.50	1.40	10	24	72	15	25
Hazelbeach	Mrs. Albert Pell	3.39	20.27	1.29	9	14	70	15	31
Rothinghm. Oastl.	H. Wate	3.02	19.22	0.85	10	17	77	18	27
Holdenby	Rev. F. C. Alderson ..	3.68	19.71	1.28	10	21	..	..	..
Kettering	C. W. Lane	3.26	19.65	1.09	10	19	73	15	31
Peterborough	J. Whitwell	3.11	18.90	0.75	10	19	73	15	33
Mazez Vicarage ..	Rev. W. D. Sweeting ..	3.08	16.48	0.83	2	20	..	..	..
Av. 19 yrs 1866-84	H. Terry	2.82	19.15	..	..	..	..	..	..

HENRY TERRY, SURGEON.

MEETINGS OF THE SOCIETY.

AUGUST.

18th.—Five members present. A letter was read from Mr. H. J. Eunson, F.G.S., respecting the swarming of Ants, on Saturday, the 15th August, in Mr. J. Eunson's garden. Mr. S. J. Newman also noticed the same occurrence in his garden about the same time. Mr. George then read an interesting account, by Mr. Robt. Rogers, of the Irchester Excursion, in which was given a list of the botanical finds obtained during the day.

SEPTEMBER.

15th.—Eighteen members present. Mr. B. Thompson, F.C.S., F.G.S., read a paper on "The Rambles of a Naturalist in some little-known localities on the Yorkshire Coast." The paper gave an interesting account of a geological excursion taken by Mr. Thompson and two friends in August, 1884; starting from Gristhorp Bay, they traced the different beds along the coast from the calcareous grit down to the Upper Lias at Whitby. Palæontological specimens obtained in the excursion were exhibited; among the most noticeable were some good specimens from the Plant bed at Gristhorp Bay, and from the Dogger beds (Inf. Ool.) near Robin Hood's Bay.

OCTOBER.

20th.—Six members present. Mr. H. N. Dixon, F.L.S., exhibited a collection of plants, collected from the neighbourhood of Yardley Hastings by Mr. Robt. Rogers, and presented by him to the Society. Many of them were grasses; one of the most interesting specimens was an abnormal specimen of white clover (*Trifolium repens*). Mr. Dixon also showed a Club Moss found in Harlestone Firs, and recorded the finding of three mosses new to the county, viz.: *Ditrichum homomallum*, *Physconitrella patens*, *Pleuridium nitidum*. A vote of thanks to Mr. Rogers for his gift was unanimously accorded.



